TM 8-6515-008-24&P

TECHNICAL MANUAL

UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

SUCTION APPARATUS, SURGICAL MODEL 6003

6515-01-246-1938

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

HEADQUARTERS, DEPARTMENT OF THE ARMY

9 SEPTEMBER 1994

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

Do not try to pull or grab the individual.

If possible, turn off the electrical power.

If you cannot turn off the electrical power, pull, push, or lift the person to safety using a dry wooden pole or a dry rope, or some other insulating material.

Send for help as soon as possible.

After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately start artificial resuscitation.

Throughout this manual are WARNINGS, CAUTIONS, and NOTES. Please take time to read these. They are there to protect you and the equipment.

WARNING

Procedures which must be observed to avoid personal injury, and even loss of life.

CAUTION

Procedures which must be observed to avoid damage to equipment, destruction of equipment, or long-term health hazards.

NOTE

Essential information that should be remembered.

ELECTRICAL AND ELECTRONIC HAZARDS

» Severe injury or death can result when any part of your body comes in contact with live electrical circuits. Medical Equipment Repairers must be especially alert to the dangers of exposed circuits, terminals, power panels, and the like.

» The electrical parameter that injures and kills is CURRENT; the force that caused current to flow is called VOLTAGE. Voltage ratings are normally assigned to live electrical circuits, power supplies, and transmission lines. You should consider all voltages of 30 or more to be hazardous.

» The physiological effect of current flowing through the human body is related to the following factors:

- The path of the current through the body.
- The magnitude of the current.
- The duration of the voltage shock or discharge that causes current flow.
- The frequency of the voltage if alternating current.
- The susceptibility of damage to your heart from the current and from repeated shocks.

» Alternating current tends to concentrate near the body's surface because of the phenomenon of "skin effect." The higher the frequency of the alternating current voltage source, the more likely the current will tend to flow in or near the skin and away from internal body organs.

» The effect of current becomes more severe with the length of time that it flows through the body; a prolonged current flow can cause severe internal burns, collapse, unconsciousness, or death.

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You can help improve this manual. If you find any mistakes or if you know a way to improve procedures, please let us know. Mail your memorandum, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 (Recommended Changes to Equipment Technical Publications) located in the back of this manual to: Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001. A reply will be furnished directly to you.

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HOW TO USE THIS MANUAL

This manual provides all the information needed to understand the capabilities, functions, and characteristics of this equipment. It describes how to set up, operate, test, and repair the equipment. You must familiarize yourself with the entire manual before operating or beginning a maintenance task.

The manual is arranged by chapters, sections, and paragraphs followed by appendixes, a glossary, an index, and DA Forms 2028-2. Use the table of contents to help locate the chapter or section for the general subject area needed. The index will help locate more specific subjects.

Multiple figures and tables are provided for your ease in using this manual. Words that are both capitalized and in quotation marks are names of components or words that you will actually see on the equipment.

Chapter 3 provides a systematic method of inspecting and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail. Make a habit of doing the checks and services in the same order each time and anything wrong will be detected quickly.

Only perform maintenance functions specified in the maintenance allocation chart for your level of maintenance. Maintenance functions specified for higher levels of maintenance frequently require additional training; test, measurement, and diagnostic equipment; or tools.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Overview.

This manual describes the suction apparatus (fig 1-1); provides equipment technical data; and provides operational and maintenance functions, services, and actions. Additional information follows:

a. Type of manual. Unit, direct support (DS), and general support (GS) maintenance (including repair parts and special tools list).

b. Model number and equipment name. Model number 6003, Suction Apparatus, Surgical.

c. Purpose of equipment. To provide gentle suction for specialized uses such as gastrointestinal decompression or suprapubic drainage.

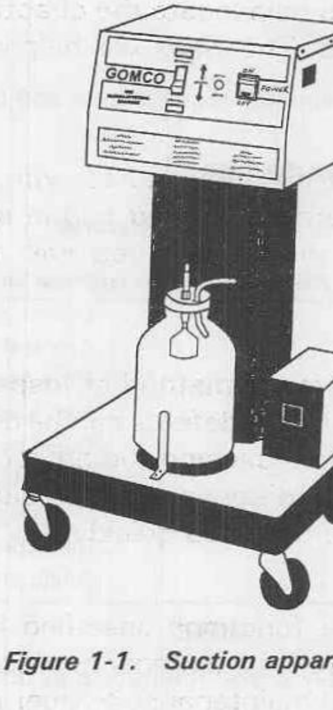


Figure 1-1. Suction apparatus.

1-2. Explanation of abbreviations and terms.

Special or unique abbreviations, acronyms, and terms used in this manual are explained in the glossary.

1-3. Maintenance forms, records, and reports.

TB 38-750-2 prescribes forms, records, reports, and procedures.

1-4. Destruction of Army materiel to prevent enemy use.

AR 40-61 contains instructions for destruction and disposal of Army medical materiel. Also, the SB 8-75 series provides periodic information and/or instructions on the destruction of medical materiel.

1-5. Administrative storage.

a. Place the suction apparatus in administrative storage for only short periods of time when a shortage of maintenance effort exists. This equipment should be in mission readiness condition within 24 hours or within the time factors determined by the directing authority. During the storage period, keep appropriate maintenance records.

b. Perform preventive maintenance checks and services (PMCS) listed in tables 3-1 and 3-2 before placing Army equipment in administrative storage. When equipment is removed from storage, perform PMCS to ensure its operational readiness.

c. Inside storage is preferred for equipment selected for administrative storage.

1-6. Preparation for storage or equipment.

Procedures to prepare the suction apparatus for storing or shipping are listed in chapter 3, section X.

1-7. Quality control (QC).

TB 740-10/DLAM 4155.5/AFR 67-43 contains QC requirements and procedures.

1-8. Nomenclature cross-reference list.

Table 1-1 identifies official versus commonly used nomenclatures.

Table 1-1. Nomenclature cross-reference list.

Common name	*Official nomenclature*
Cap and float assembly	Cap and float shut off mechanism
Overflow protection device	Float assembly
Power switch indicator	Pilot light
Pump cycle indicator	Cycle lamp
Stainless steel cover	Control/pump module cover
Suction apparatus	Suction apparatus, surgical
Vacuum select switch	Selector switch
Vacuum setting indicator	White lamp

NOTE

A suction apparatus is also referred to as an aspirator.

A 2800-mL collection bottle is commonly known as a 1-gallon bottle.

1-9. Reporting and processing medical materiel complaints and/or quality improvement reports.

AR 40-61 prescribes procedures for submitting medical materiel complaints and/or quality improvement reports for the suction apparatus.

1-10. Warranty information.

A warranty is not applicable.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-11. Equipment characteristics, capabilities, and features.

a. The suction apparatus is a self-contained, mobile unit with an integral cart designed for indoor use. The suction apparatus removes accumulated fluids through tubing inserted into a patient's oral or nasal passages and connected to drainage tubing that empty into a collection system.

b. The suction apparatus operates from multiple voltages and frequencies.

c. The integral cart has four non-marking casters. Two casters include brakes.

d. The electronic control system regulates the vacuum pump to provide preset levels of 90 or 120 mmHg.

e. The glass collection bottle is marked with graduations to 2800 mL and its cap and float assembly incorporates an overflow protection device.

f. The suction apparatus can operate continuously.

1-12. Component and accessory descriptions.

a. Components (fig 1-2).

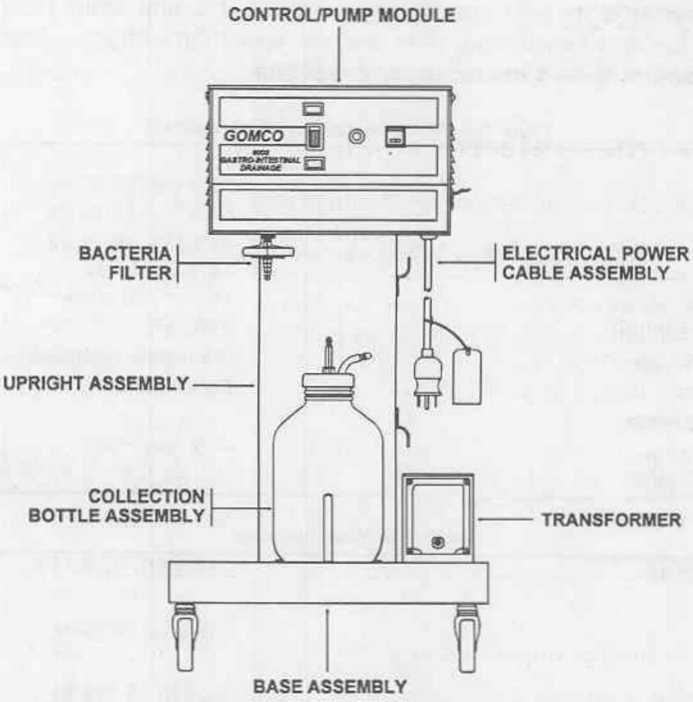

CONTROL/PUMP MODULE
GOMCO
GASTRO-INTESTINAL DRAINAGE
BACTERIA FILTER
ELECTRICAL POWER CABLE ASSEMBLY
UPRIGHT ASSEMBLY
COLLECTION BOTTLE ASSEMBLY
TRANSFORMER
BASE ASSEMBLY

Figure 1-2. Components and accessories.

(1) *Control/pump module.* The control/pump module incorporates the vacuum pump, the control printed circuit board (PCB), and the operational controls. A stainless steel cover provides a work surface. A black plastic handle mounted on the rear of the module provides for moving the suction apparatus.

(2) *Electrical power cable assembly.* The electrical power cable assembly, hanging down from the rear of the right side of the control/pump module, is connected directly into a receptacle for 115-volt operation.

(3) *Transformer.* The step-down transformer, located on the right side of the base assembly, is used for 230-volt operation.

(4) *Base assembly*. The base assembly incorporates four casters and the transformer for 230-volt operation.

(5) *Upright assembly*. The upright assembly is mounted on the base assembly and provides support for the control/pump module. The right side of the upright assembly provides cable clips for storing the electrical power cable assembly of the transformer. Cable clips mounted on the rear of the upright assembly provide for storage of the suction apparatus electrical power cable assembly.

b. Accessories.

(1) *Collection bottle assembly.* The collection bottle assembly consists of a 2800-mL glass bottle, bottle cap, and an overflow protection device.

(2) *Bacteria filter.* The bacteria filter prevents fluid and aerosol contamination of the suction apparatus. The filter has a hydrophobic, microporous membrane which filters air with maximum efficiency while blocking the flow of aqueous fluids.

(3) *Tubing.* The disposable tubing package contains a 15-inch and 72-inch length of clear polyvinyl chloride (PVC). Each end of the tubing includes a graduated size connector.

1-13. Tabulated data, decals, and data plates.

The tabulated data provides miscellaneous characteristics, specifications, and other information for the suction apparatus.

a. Miscellaneous characteristics and specifications. Table 1-2 and table 1-3 provide a broad range of miscellaneous characteristics and specifications to include operating voltages, vacuum ranges, flow rates, operating/storing temperature ranges, dimensions, and weights.

Table 1-2. Miscellaneous characteristics.

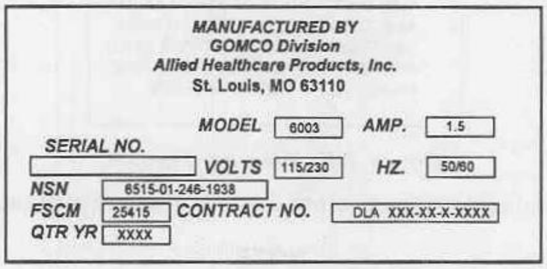
Dimensions	
Height	83.2 cm (32.75 in)
Width	46.4 cm (18.25 in)
Depth	42.5 cm (16.75 in)
Weight	19.5 kg (43 lb)
Vacuum pump resistance range	155 to 160 ohms
Collection bottle capacity	2800 mL
Bacteria filter efficiency	0.3 micron (particles in air)
Duty cycle	Continuous
Operating/storing ranges	
Humidity	90% maximum
Temperature range	-17.78°C (0°F) to 48.9°C (120°F)

Table 1-3. Specifications.

Voltages/frequencies	115 VAC, 50/60 Hz or 230 VAC, 50/60 Hz
Vacuum ranges	
90-mm position	85.5 to 99 mmHg
120-mm position	114 to 132 mmHg
Flow rates (air)	
90-mm position	0.25 lpm
120-mm position	0.3 lpm
Vacuum pump cycles, 90-mm position	
ON TIME	2.1 to 2.25 sec
OFF TIME	19.0 to 22.0 sec
Vacuum pump cycles, 120-mm position	
ON TIME	3.4 to 3.75 sec
OFF TIME	19.0 to 22.0 sec

b. Identification, instruction, and warning plates, decals, or markings.

(1) The suction apparatus manufacturer data plate (located on the right side of the control/pump module is depicted in figure 1-3.

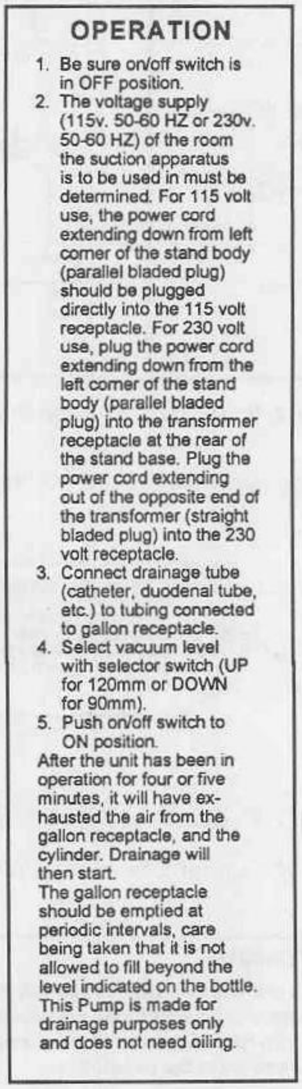


MANUFACTURED BY
GOMCO Division
Allied Healthcare Products, Inc.
St. Louis, MO 63110

MODEL 6003
AMP. 1.5
SERIAL NO.
VOLTS 115/230
HZ. 50/60
NSN 6515-01-246-1938
FSCM 25415
CONTRACT NO. DLA XXX-XX-X-XXXX
QTR YR XXXX

Figure 1-3. Manufacturer data plate.

(2) A decal (located on the right side of the control/pump module) providing operating instructions is depicted in figure 1-4.



OPERATION

1. Be sure on/off switch is in OFF position.
2. The voltage supply (115v. 50-60 HZ or 230v. 50-60 HZ) of the room the suction apparatus is to be used in must be determined. For 115 volt use, the power cord extending down from left corner of the stand body (parallel bladed plug) should be plugged directly into the 115 volt receptacle. For 230 volt use, plug the power cord extending down from the left corner of the stand body (parallel bladed plug) into the transformer receptacle at the rear of the stand base. Plug the power cord extending out of the opposite end of the transformer (straight bladed plug) into the 230 volt receptacle.
3. Connect drainage tube (catheter, duodenal tube, etc.) to tubing connected to gallon receptacle.
4. Select vacuum level with selector switch (UP for 120mm or DOWN for 90mm).
5. Push on/off switch to ON position.

After the unit has been in operation for four or five minutes, it will have exhausted the air from the gallon receptacle, and the cylinder. Drainage will then start.

The gallon receptacle should be emptied at periodic intervals, care being taken that it is not allowed to fill beyond the level indicated on the bottle.

This Pump is made for drainage purposes only and does not need oiling.

Figure 1-4. Operating instructions decal.

(3) A warning imprint (located on the top right side of the base assembly) is depicted in figure 1-5.

WARNING

THIS UNIT IS EQUIPPED WITH A CAP AND FLOAT SHUT OFF MECHANISM. USE OF BOTTLES WITHOUT THIS SYSTEM MAY CAUSE PUMP FLOODING WHICH VOIDS THIS WARRANTY.

Figure 1-5. Warning imprint.

(4) A voltage conversion decal (located on the top of the transformer) is depicted in figure 1-6.

NOTE

The decal should reflect 230 V, not 220 V.

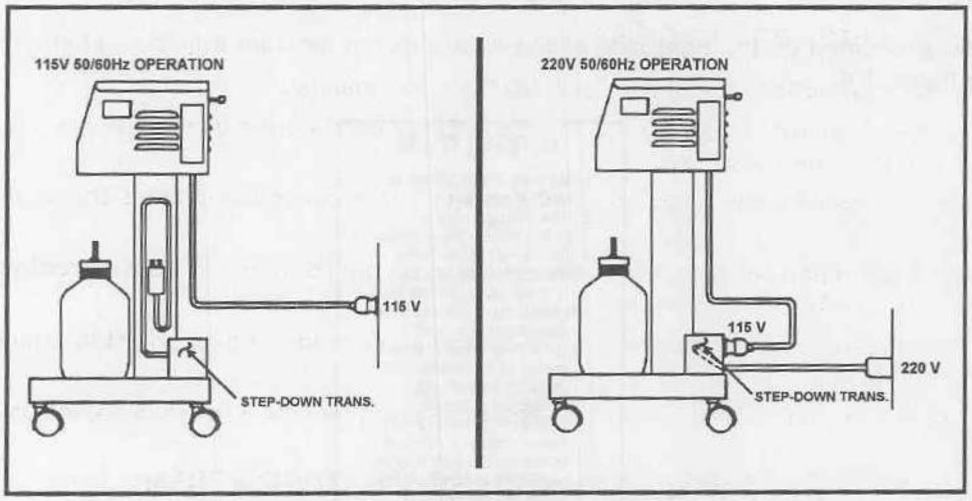
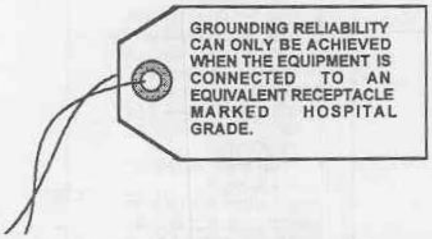


Figure 1-6. Voltage conversion decal.

(5) A cardboard tag (fastened to the electrical power cable assembly) providing electrical information is depicted in figure 1-7.



GROUNDING RELIABILITY CAN ONLY BE ACHIEVED WHEN THE EQUIPMENT IS CONNECTED TO AN EQUIVALENT RECEPTACLE MARKED HOSPITAL GRADE.

Figure 1-7. Cardboard instruction tag.

(6) A decal (located on the rear of the upright assembly) providing information about the transformer fuse is depicted in figure 1-8.

FUSE REPLACEMENT

1. Disconnect the transformer from its 230 volt power source.
2. Unscrew the fuse cap located on the transformer.
3. Discard the blown fuse and insert a new 3 amp type AGC-3 fuse.
4. Screw the fuse cap on to the transformer.

Figure 1-8. Transformer fuse decal.

(7) Imprinting (located on the front panel of the control/pump module) providing danger and caution notices are depicted in figure 1-9.

DANGER
POSSIBLE EXPLOSION HAZARD IF
USED IN PRESENCE OF
FLAMMABLE ANESTHETICS

CAUTION
ELECTRIC SHOCK HAZARD. DO NOT
REMOVE COVER. REFER SERVICING
TO QUALIFIED SERVICE PERSONNEL.

Figure 1-9. Front panel imprinting.

1-14. Model differences.

Model differences are not applicable since this manual covers a single model.

1-15. Safety, care, and handling.

a. Observe each WARNING, CAUTION, and NOTE in this manual.

b. Read the operating instructions in this manual before operating the unit. Refer servicing to qualified Medical Equipment Repairer personnel.

c. Install the bacteria filter carefully to prevent damage to its threads due to cross-threading or excessive tightening.

d. The use of a collection bottle without an overflow protection device may cause overflow and damage to the bacteria filter and/or the vacuum pump.

e. Operator/user personnel will not remove the control/pump module cover. There is a danger of electric shock.

f. Do not use in the presence of flammable anesthetics to preclude a possible explosion.

Section III. PRINCIPLES OF OPERATION

1-16. Basic operation (fig 1-10).

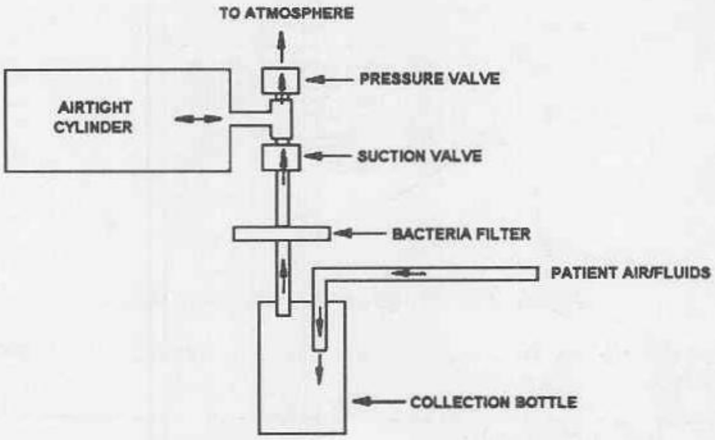


Figure 1-10. Vacuum cycle.

a. The low negative pressure of the suction apparatus is developed by the expansion and contraction of air within an airtight cylinder. The expansion and contraction of the air in the cylinder is controlled by suction and pressure valves and an electronic timing circuit to produce a low level of vacuum.

b. The airtight cylinder contains a heating element. During the on cycle, 115 VAC is applied to the heating element for a period of time dependent upon the vacuum setting. The heating element heats the air within the cylinder and expanded (heated) air is expelled into the atmosphere through the pressure valve. The amber "PUMP CYCLE" indicator on the control panel is illuminated during the heating cycle.

c. During the off cycle, voltage to the heating element is interrupted. The pressure valve now closes and the remaining air within the cylinder cools and contracts causing a partial vacuum which opens the suction valve. Air from the collection bottle is now drawn into the cylinder to fill the vacuum. The amber "PUMP CYCLE" indicator on the control panel is off. Suctioning from a patient occurs during this off cycle.

CHAPTER 2

OPERATING INFORMATION AND INSTRUCTIONS

Section I. PREPARATION FOR OPERATION

2-1. Scope.

This manual is primarily intended to provide information, instructions, and procedures for the maintenance of the suction apparatus. The operating information and instructions, while valid, do not provide sufficient information for use of the suction apparatus on a patient. Only qualified medical personnel are trained in specific suctioning techniques and procedures.

2-2. Assembly and interconnections.

a. Assembly. The suction apparatus may or may not require assembly dependent upon the standard operating procedures of your unit. If required, assembly procedures are as follows:

(1) *Bacteria filter.* Screw the threaded end of the filter into the filter and vacuum connector as illustrated in figure 2-1.

NOTE

The bacteria filter may vary in size or shape depending upon the source of supply. The bacteria filter is illustrated as square.

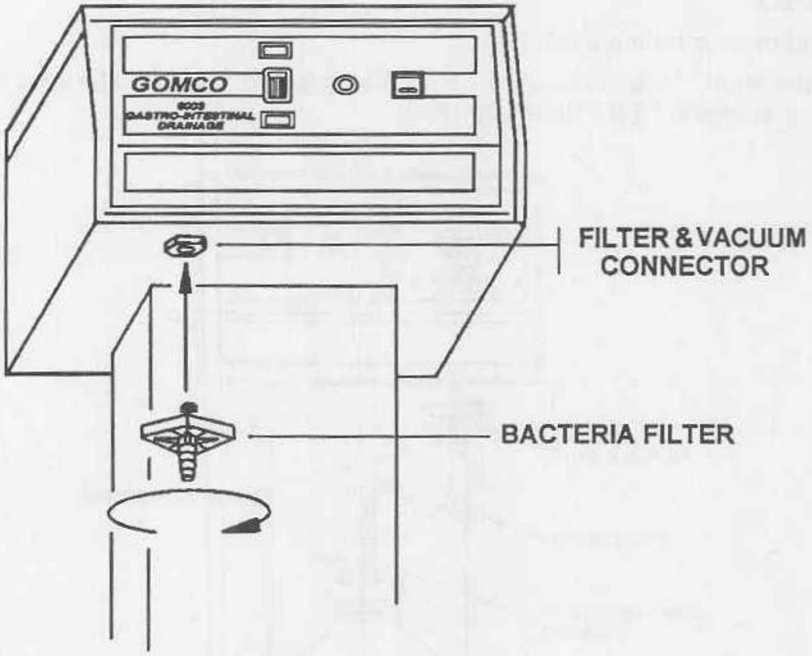


Figure 2-1. Installation of bacteria filter.

(2) *Collection bottle assembly.*

(a) Verify that the cap and float assembly is assembled or follow steps (b) through (f).

(b) Verify that the small float gasket is in place prior to connecting the cap and float assemblies together.

(c) Screw the float assembly into the cap assembly by turning it in a counterclockwise direction (fig 2-2).

(d) Check that the float moves freely upward and downward.

(e) Insert the float into the collection bottle opening and then screw the cap and float assembly onto the collection bottle.

(f) Insert the collection bottle assembly into its brackets on the base assembly (fig 2-3).

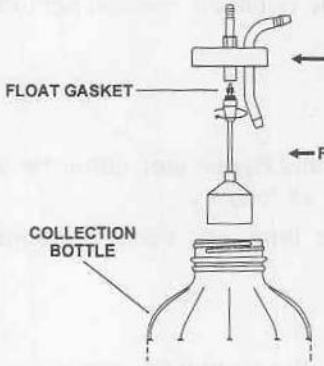

CAP ASSEMBLY
FLOAT GASKET
FLOAT ASSEMBLY
COLLECTION BOTTLE

Figure 2-2. Assembling the cap and float assembly.

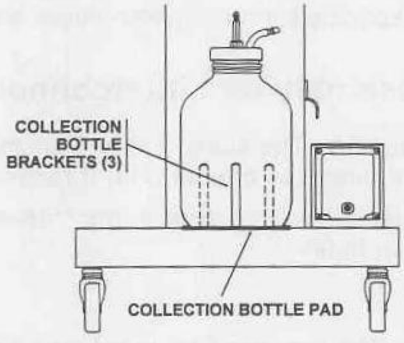

COLLECTION BOTTLE BRACKETS (3)
COLLECTION BOTTLE PAD

Figure 2-3. Bottle brackets.

b. *Interconnections.*

(1) Locate and open a tubing package.

(2) Connect the short (15-inch) length of PVC tubing to the bacteria filter barb fitting and to the cap assembly barb fitting stamped "TO PUMP" (fig 2-4).

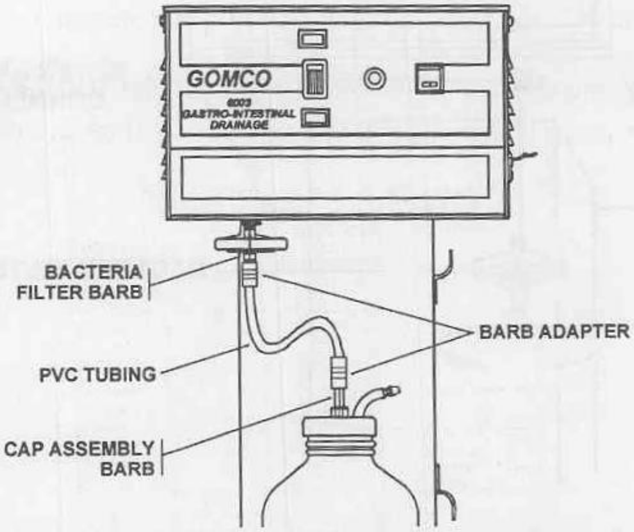

GOMCO
6003
GASTRO-INTESTINAL
DRAINAGE
BACTERIA FILTER BARB
BARB ADAPTER
PVC TUBING
CAP ASSEMBLY BARB

Figure 2-4. PVC tubing connections.

(3) Connect the long (72-inch) length of PVC tubing to the bent tube barb on the cap assembly. Then, press the other end of the tubing into the Devilbiss hook on the right side of the control/pump module (fig 2-5).

NOTE

A cannula or other medical instrument will be fitted to the open end of the long tube by trained medical specialist personnel.

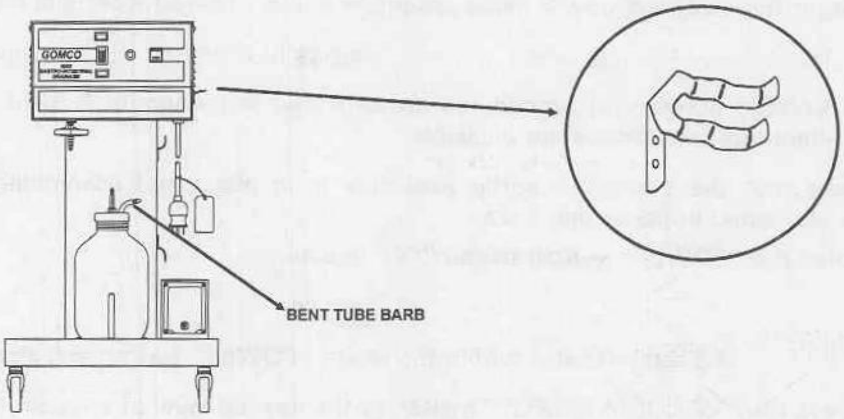

GOMCO
BENT TUBE BARB

Figure 2-5. Devilbiss hook.

Section II. OPERATING INFORMATION

2-3. Controls and indicators (fig 2-6).

a. "POWER" switch: The white rocker switch with a red inset controls electrical power to the suction apparatus. The switch illuminates in the "ON" position.

b. "PUMP CYCLE" indicator. The round amber indicator illuminates during the intermittent pump action when the pump is energized.

c. "VACUUM SELECT" switch. The white rocker switch selects the desired vacuum setting.

d. Vacuum select indicator. The rectangular white indicators illuminate the selected vacuum level.

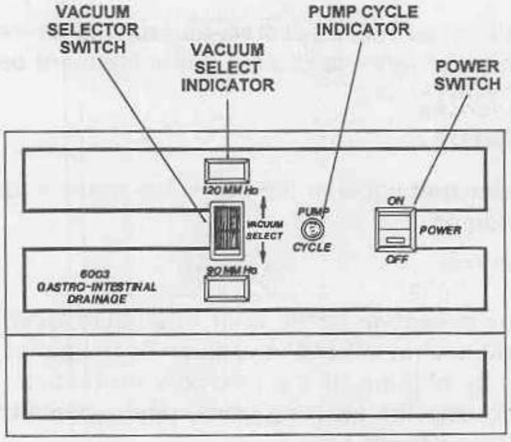

VACUUM SELECTOR SWITCH
VACUUM SELECT INDICATOR
PUMP CYCLE INDICATOR
POWER SWITCH
120 MM Hg
VACUUM SELECT
90 MM Hg
PUMP
CYCLE
ON
POWER
OFF
6003
GASTRO-INTESTINAL
DRAINAGE

Figure 2-6. Controls and indicators.

Section III. OPERATING INSTRUCTIONS

2-4. Initial start-up procedures.

a. Roll the suction apparatus either to an equipment preparation area or to the area of use.

b. Ensure that the "POWER" switch is in its "OFF" position or depress the switch to its "OFF" position.

c. Remove the coiled electrical power cable assembly from the cable clips mounted on the rear of the upright assembly.

d. Connect the electrical power cable assembly into a 115-volt electrical receptacle.

NOTE

Voltage conversion procedures are provided in paragraph 3-33 if only 230-volt electrical receptacles are available.

e. Ensure that the collection bottle assembly is in place and assembled in accordance with the procedures contained in paragraph 2-2a.

f. Depress the "POWER" switch to the "ON" position.

NOTE

The red indicator within the white "POWER" switch will illuminate.

g. Depress the "VACUUM SELECT" switch to the desired level of vacuum (120 mmHg or 90 mmHg).

NOTE

The white indicator for the selected level of vacuum will illuminate.

h. Observe that the "PUMP CYCLE" indicator intermittently illuminates.

NOTE

The selected level of vacuum will be reached in 4 to 5 minutes.

i. Submerge the end of the PVC patient tubing into a container of water and observe the aspiration of the water into the collection bottle.

j. Remove the PVC patient tubing from the container of water. The suction apparatus is now ready for patient use by qualified medical personnel.

2-5. Routine start-up procedures.

Routine start-up procedures will follow the initial start-up procedures except for differences involving assembly and interconnections in accordance with your unit's standard operating procedures.

2-6. Operating procedures.

a. Observe periodically the level of liquid in the collection bottle and empty it in accordance with your unit's standard operating procedures.

CAUTION

Failure to empty the collection bottle prior to a liquid level reaching its 2800 mL graduation will result in shut-off of the vacuum to the patient and pose a potential risk to the patient. In addition, if the overflow protection device would fail, the bacteria filter would also fail from liquid contamination and shut off the suction with a higher resultant patient risk.

b. Observe the "PUMP CYCLE" indicator for intermittent illumination as indicated in table 2-1.

Table 2-1. Pump cycle timeframes.

VACUUM SELECT LEVEL	*INDICATOR ON*	*INDICATOR OFF*
90 mmHg	2.0 sec	20 sec
120 mmHg	3.5 sec	20 sec

c. Observe the flow of patient fluids within the clear PVC tubing. Fluids should be drawn into the collection bottle during the off period of the "PUMP CYCLE" indicator.

d. Observe that the short 15-inch length of clear PVC tubing is dry to prevent bacteria filter contamination and the subsequent unplanned shut-off of the suction to the patient.

2-7. Shut-down procedures.

Shut-down procedures are as follows:

a. Depress the "POWER" switch to the "OFF" position.

b. Disconnect the short 15-inch length of clear PVC tubing from the bacteria filter barb fitting to shut down the suction.

c. Disconnect the patient from the long (72-inch) length of PVC tubing.

d. Dispose of both lengths of tubing and collected patient fluids in accordance with your unit's standard operating procedures.

Section IV. OPERATION OF AUXILIARY EQUIPMENT

2-8. Associated support items of equipment.

The suction apparatus requires no associated support items of equipment other than an electrical power generator, which is shared with multiple items of surgical equipment for electrical power.

2-9. Associated material.

Associated material is identified in appendix D and appendix E.

Section V. CLEANING, DISINFECTING, AND STERILIZING PROCEDURES

2-10. General.

a. The suction apparatus and operating accessories should be clean at all times. Specific cleaning, disinfecting, and/or sterilizing procedures are provided in subsequent paragraphs.

b. Accessories identified as disposable should not be cleaned and reused. These accessories were designed and manufactured for one use only.

c. The collection bottle assembly should be removed from the base assembly to facilitate cleaning.

2-11. Suction apparatus.

a. Cleaning.

(1) Turn off the suction apparatus by depressing the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Remove the collection bottle assembly.

(4) Wipe the suction apparatus using a mild detergent with a soft cloth.

(5) Dry the suction apparatus with a soft cloth.

b. Disinfecting. Disinfect the suction apparatus by wiping it with a liquid disinfectant or lightly spraying it with disinfectant in accordance with your unit's standard operating procedures.

2-12. Collection bottle assembly.

a. Cleaning.

(1) Turn off the suction apparatus by depressing the "POWER" switch to the "OFF" position.

(2) Disconnect both lengths of PVC tubing from the suction apparatus. Dispose of the tubing in accordance with the procedures contained in your unit's standard operating procedures.

(3) Unscrew the cap and float assembly from the collection bottle.

(4) Immerse the cap and float assembly in a warm detergent solution.

(5) Dispose of any patient drainage fluids in accordance with the procedures contained in your unit's standard operating procedures. Then immerse the collection bottle in the detergent solution.

(6) Unscrew the float assembly from the cap assembly.

NOTE

Ensure that the small float gasket is not dislodged and lost while cleaning the float assembly.

(7) Scrub the float assembly and the cap assembly lightly with a nylon bristle brush in the warm detergent solution.

(8) Rinse the assemblies thoroughly in warm water and aerate them.

b. Sterilizing.

(1) Sterilize the float and cap assemblies in a steam sterilizer for 15 minutes in accordance with the steam sterilizer's manufacturer instructions and your unit's standard operating procedures.

CAUTION

Do not steam sterilize the collection bottle.

(2) If required, sterilize the collection bottle with ethylene oxide gas (EtO). Follow the EtO manufacturer's instructions and your unit's standard operating procedures.

c. Reassembling.

(1) Check that the small float gasket is in place or install a replacement gasket.

(2) Screw the float assembly into the cap assembly.

Section VI. OPERATION UNDER UNUSUAL CONDITIONS

2-13. General.

The mobile suction apparatus is designed to operate only within a field medical treatment facility.

CHAPTER 3

UNIT LEVEL MAINTENANCE

Section I. GENERAL INFORMATION

3-1. Overview.

a. Unit level maintenance. This level of maintenance is the responsibility of and performed by a using unit on its assigned equipment. Responsibilities are stratified as follows:

(1) *Operator maintenance.* This segment of unit level maintenance is performed by operator/user personnel and consists of equipment operational functions; routine services like cleaning, dusting, washing, checking for frayed cables, and stowing items not in use; and checking for loose hardware, replacing operator accessories, and replacing operator repair parts. Replacing operator parts will not require extensive disassembly or assembly of the end item, critical adjustments after replacement, or the extensive use of tools.

(2) *Specialist maintenance.* This segment of unit level maintenance is performed only by trained Medical Equipment Repairers. The functions and services include—

(a) Scheduling and performing PMCS, electrical safety inspections and tests, and calibration/verification/certification (CVC) services.

(b) Performing unscheduled maintenance functions with emphasis on replacing assemblies, modules, or PCBs, when available.

(c) Operating a repair parts program to include Class VIII repair parts as well as other commodity class repair parts used on medical equipment.

(d) Maintaining a library of technical manuals (TMs), manufacturers' literature, repair parts information, and related materials.

(e) Conducting inspections on new or transferred equipment.

(f) Establishing administrative procedures for the control and administration of maintenance services in accordance with TB 38-750-2.

(g) Notifying support maintenance battalions of requirements and/or evacuating unserviceable equipment, assemblies, or modules.

b. Maintenance functions. Maintenance functions, both preventive and corrective, which are beyond the scope of the operator/user are assigned to unit level Maintenance Equipment Repairer personnel. These personnel will perform the majority of maintenance required for the equipment except some tasks involving the vacuum pump, PCB, or stand.

3-2. Tools and test equipment.

Common tools and test equipment required for unit level maintenance of the equipment are listed in appendix B, section III of this manual. Refer to your unit's modified table of organization and equipment (MTOE) for authorized items.

3-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III of this manual.

3-4. Expendable supplies.

Expendable and durable supplies and materials required for maintenance of the equipment are listed in appendix D, section II of this manual.

3-5. Repair parts.

Repair parts required for unit level maintenance are listed in appendix E, section II of this manual.

3-6. Special tools.

Special tools required for unit level maintenance of the equipment are listed in appendix E, section III of this manual.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

3-7. Unpacking the suction apparatus.

a. Remove the straps from the cardboard shipping container.

b. Open the top flaps of the container.

c. Lift upward on the shipping container body and remove it. Set it aside.

d. Remove the foam blocks from under the base assembly. Set them aside.

e. Lift and roll the suction apparatus off the shipping container base. Set it aside.

f. Open the small cardboard carton setting on the base assembly and remove the contents. Set the box aside.

g. Verify receipt of the following materiel:

(1) Suction apparatus.
(2) Maintenance and service manuals (2).
(3) Operation manuals (2).
(4) Collection bottle with cap and float assembies.
(5) Bacteria filters (3/pg).
(6) Tubing (1 15-inch and 1 72-inch tubing lengths).
(7) Pressure valve and manifold assembly (spare).

Section III. LUBRICATION INSTRUCTIONS

3-8. General.

No lubrication of the suction apparatus is required.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-9. General.

a. The suction apparatus must be inspected and serviced systematically to ensure that it is ready for operation at all times. Inspection will allow defects to be discovered and corrected before they result in serious damage or failure.

b. Table 3-1 contains a list of items to be performed by unit level operator/user personnel. This PMCS table is also referred to as "-10 PMCS" requirements. Preventive maintenance by operator/user personnel is not limited to performing the checks and services in table 3-1. There are things operator/user personnel should do any time they need to be done, such as checking general cleanliness, observing for improper operational indicators, and maintaining the proper quantities of accessories.

c. Table 3-2 contains a list of items to be performed by unit level Medical Equipment Repairers. This PMCS table is also referred to as "-20 PMCS" requirements.

d. Some items to be inspected will be listed in both table 3-1 and table 3-2 to stress their importance, to provide a quality control check on multiple operator/user personnel, and to identify more comprehensive procedures to be accomplished by unit level Medical Equipment Repairers.

e. The following is a list of both PMCS table column headings with a description of the information found in each column:

(1) *Item No.* This column shows the sequence in which to do the PMCS, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

(2) *Interval.* This column shows when each PMCS item is to be serviced: **B** - Before Operation, **D** - During Operation, **A** - After Operation, **Q** - Quarterly, and **S** - Semiannually. **B, D,** and **A** should be performed with daily use of the equipment.

NOTE

When the suction apparatus must be kept in continuous operation, check and service only those items that will not disrupt operation. Perform the complete daily checks and services when the equipment can be shut down.

(3) *Item to be Inspected and Procedure.* This column identifies the general area or specific part to be checked or serviced.

(4) *Equipment is not Ready/Available If:.* This column lists conditions that make the equipment unavailable or unusable.

Table 3-1. Operator preventive maintenance checks and services.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
1						**Suction apparatus.**	
	X		X		X	*a.* Ensure that all components and accessories are on hand.	Missing components or accessories prevent operation of the suction apparatus.
	X	X	X		X	*b.* Verify performance of the operational tests.	The operational tests indicate incorrect operation or a hazardous situation.
2						**Control/pump module.**	
	X		X		X	*a.* Check for a broken, damaged, or inoperable "POWER" switch or "VACUUM SELECT" switch.	A broken, damaged, or inoperable switch prevents operation.
	X		X		X	*b.* Check for a broken or inoperable "POWER" indicator or "VACUUM SELECT" indicator(s).	A broken or inoperable indicator prevents operation.

Table 3-1. Operator preventive maintenance checks and services - continued.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
	X				X	*c.* Ensure that a bacteria filter can be properly installed into the filter connector.	The bacteria filter connector is damaged and a filter cannot be installed.
	X				X	*d.* Inspect the electrical power cable assembly for cuts, deterioration, fraying, or other physical damage.	The condition of the cable assembly prevents operation or causes a safety hazard.
3	X				X	**Upright assembly.** Check that the upright assembly is tightly connected to the control/pump module and the base assembly.	The physical assembly of the suction apparatus prevents safe operation.
4						**Base assembly.**	
	X	X			X	*a.* Ensure that the bottle brackets hold the collection bottle assembly in place.	Missing or broken bottle bracket(s) would enable the collection bottle assembly to fall off the base assembly.
	X				X	*b.* Check the transformer for tight mounting to the base assembly.	A loose transformer could fall from the base assembly and interrupt patient treatment.
5						**Collection bottle assembly.**	
	X		X		X	*a.* Check the bottle opening for nicks or cracks.	The condition of the collection bottle assembly prevents proper operation.
	X		X		X	*b.* Test the float assembly for easy movement.	The float assembly may permit overflow and interruption of the suction apparatus.

Table 3-2. Repairer preventive maintenance checks and services.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
1						**Suction apparatus.**	
					X	*a.* Verify that components and accessories have been inventoried and/or requisitioned by operator/ user personnel.	Missing components or accessories prevent operation.
					X	*b.* Verify the results of operator/ user tests.	Operator/user tests indicate improper operation.
						c. Verify operation by performing repairer tests.	Test results indicate improper or unsafe operation.
2						**Control/pump module.**	
					X	*a.* Check for a broken, damaged, or inoperable "POWER" switch or "VACUUM SELECT" switch.	A broken, damaged, or inoperable switch prevents operation.
					X	*b.* Check for a broken or inoperable "POWER" or "VACUUM SELECT" indicator(s).	A broken or inoperable indicator prevents operation.
					X	*c.* Ensure that a bacteria filter can be properly installed into the filter connector.	The bacteria filter connector is damaged and a filter cannot be installed.
					X	*d.* Inspect the electrical power cable assembly for cuts, deterioration, fraying, or other physical damage.	The condition of the cable assembly prevents operation or causes a safety hazard.
3					X	**Upright assembly.** Check that the upright assembly is tightly connected to the control/pump module and the base assembly.	The physical assembly of the suction apparatus prevents safe operation.
4						**Base assembly.**	
					X	*a.* Ensure that the bottle brackets hold the collection bottle assembly in place.	Missing or broken bottle bracket(s) would enable the collection bottle assembly to fall off the base assembly.
					X	*b.* Check the transformer for tight mounting to the base assembly.	A loose transformer could fall from the base assembly and interrupt patient treatment.
5					X	**Collection bottle assembly.** Test the float assembly for easy movement.	The float assembly may permit overflow and interruption of the suction apparatus.

3-10. Reporting deficiencies.

Operator/user personnel will report problems with the suction apparatus discovered during their "-10 PMCS" that they are unable to correct. Refer to TB 38-750-2 and report the deficiency using the proper forms. Consult with your unit Medical Equipment Repairer if you need assistance.

Section V. OPERATIONAL TESTING

3-11. General.

This section contains procedures for operational testing of the suction apparatus by both operator/user personnel and Medical Equipment Repairer personnel. Deficiencies identified by operator/user personnel should be reported to Medical Equipment Repairer personnel.

3-12. Operator/user tests.

a. Vacuum pump cycle.

(1) Connect the electrical power cable assembly into a 115-volt electrical receptacle.

(2) Verify that the components and accessories of the suction apparatus are assembled and interconnected in accordance with the procedures contained in paragraph 2-2.

(3) Depress the "POWER" switch to the "ON" position.

(4) Depress the "VACUUM SELECT" switch to the 90 mmHg level.

(5) Observe that the "PUMP CYCLE" indicator intermittently illuminates.

(6) Close the open end of the PVC patient tubing to allow the vacuum to reach its selected level (90 mmHg) in approximately 4 to 5 minutes.

(7) Open the end of the PVC patient tubing and submerge it into a container of water and observe the aspiration of water into the collection bottle.

NOTE

Verify that the water is aspirated into the collection bottle when the "PUMP CYCLE" indicator is NOT illuminated.

(8) Remove the PVC patient tubing from the container of water and perform the next test.

b. Vacuum system leak test.

NOTE

Follow procedures (1) through (6) of the preceding test (vacuum pump cycle) if this test is performed independently.

(1) Pinch the short length (15-inch) of PVC tubing, connected between the bacteria filter and the collection bottle assembly. Use forceps or other similar instrument to hold the tubing closed.

(2) Depress the "POWER" switch to its "OFF" position.

(3) Allow the suction apparatus to remain undisturbed for approximately 5 minutes.

(4) Open the end of the PVC patient tubing and listen. Fast movement of air into the collection bottle indicates the vacuum system was properly sealed.

NOTE

Notify your unit Medical Equipment Repairer if the vacuum system leaks.

3-13. Medical Equipment Repairer tests.

a. Vacuum levels.

(1) Connect the electrical power cable assembly into a 115-volt electrical receptacle.

(2) Verify that the components and accessories of the suction apparatus are assembled and interconnected in accordance with the procedures contained in paragraph 2-2.

(3) Connect a mercury manometer, a calibrated vacuum gauge, or the calibrator-analyzer into the open end of the PVC patient tubing.

(4) Depress the "POWER" switch to the "ON" position.

(5) Depress the "VACUUM SELECT" switch to the 90 mmHg level.

(6) Observe that the "PUMP CYCLE" indicator intermittently illuminates.

(7) Allow the vacuum pump to operate for approximately 15 minutes.

(8) Observe the mercury manometer, the calibrated vacuum gauge, or the calibrator-analyzer. Verify that the vacuum level is between 85.5 mmHg and 99 mmHg. Record the vacuum level.

(9) Depress the "VACUUM SELECT" switch to the 120 mmHg level.

(10) Allow the vacuum pump to operate for another several minutes.

(11) Observe the mercury manometer, the calibrated vacuum gauge, or the calibrator-analyzer. Verify that the vacuum level is between 114 mmHg and 132 mmHg.

(12) Perform the applicable troubleshooting procedures in accordance with this chapter, section VI, if either vacuum level is less than or more than the specified levels.

(13) Depress the "POWER" switch to the "OFF" position.

(14) Remove the mercury manometer, the calibrated vacuum gauge, or the calibrator-analyzer from the PVC patient tubing.

(15) Shut down the suction apparatus by following the procedures in paragraph 2-7.

b. Pump cycles.

(1) Connect the electrical power cable assembly into a 115-volt electrical receptacle.

(2) Verify that the components and accessories of the suction apparatus are assembled and interconnected in accordance with the procedures contained in paragraph 2-2.

(3) Close the end of the patient PVC tubing.

(4) Depress the "POWER" switch to the "ON" position.

(5) Depress the "VACUUM SELECT" switch to the 90 mmHg level.

(6) Time the vacuum pump cycles with a stopwatch by observing the "PUMP CYCLE" indicator. Verify that the vacuum pump on cycle is between 2.10 and 2.25 seconds and that the vacuum pump off cycle is between 19 and 22 seconds.

(7) Record the vacuum pump cycle on/off period(s) if less than or more than the specified period.

(8) Depress the "VACUUM SELECT" switch to the 120 mmHg position.

(9) Time the vacuum pump cycles again with a stopwatch by observing the "PUMP CYCLE" indicator. Verify that the vacuum pump on cycle is between 3.40 and 3.75 seconds and that the vacuum pump off cycle is between 19 and 22 seconds.

(10) Record the vacuum pump cycle on/off period(s) if less than or more than the specified period.

(11) Perform the applicable troubleshooting procedures in accordance with this chapter, section VI, if either pump cycle is either less than or more than the specified times in seconds.

(12) Depress the "POWER" switch to the "OFF" position.

(13) Open the patient PVC tubing.

(14) Shut down the suction apparatus by following the procedures contained in paragraph 2-7.

c. Flow rates.

(1) Connect the electrical power cable assembly into a 115-volt electrical receptacle.

(2) Verify that the components and accessories of the suction apparatus are assembled and interconnected in accordance with the procedures contained in paragraph 2-2.

(3) Open the short length of PVC tubing between the bacteria filter and the collection bottle assembly. Then, insert a calibrator-analyzer into the vacuum system and reconnect the system.

(4) Depress the "POWER" switch to the "ON" position.

(5) Depress the "VACUUM SELECT" switch to the 90 mmHg level.

NOTE

> Allow the vacuum pump to operate for approximately 15 minutes to create a stable vacuum pump cylinder temperature.

(6) Observe the flowmeter and verify the vacuum flow rate at 0.25 liters per minute (lpm) ±10 percent. Record the flow rate.

(7) Depress the "VACUUM SELECT" switch to the 120 mmHg level.

(8) Allow the vacuum pump to operate for another several minutes.

(9) Observe the calibrator-analyzer and verify the vacuum flow rate at 0.30 lpm ±10 percent. Record the flow rate.

(10) If the flow rates are not within the specified tolerances, refer to the control circuit adjustments contained in paragraph 3-19. Adjust the on or off cycles to meet the specified vacuum flow rates and the specified on/off cycles.

(11) Depress the "POWER" switch to the "OFF" position.

Section VI. TROUBLESHOOTING

3-14. General.

a. Troubleshooting information for suction apparatus operator/user personnel and for Medical Equipment Repairer personnel is provided in this section. Corrective actions beyond the capability or authority of operator/user personnel will be indicated by the phrase "Notify your unit's Medical Equipment Repairer."

b. This manual cannot list all possible malfunctions. If a malfunction is either not listed or is not determined by routine diagnostic procedures, notify your appropriate maintenance support unit.

3-15. Operator/user troubleshooting.

Operator/user troubleshooting procedures are provided in table 3-3. Each symptom is followed by possible causes and corrective actions.

Table 3-3. Operator/user troubleshooting.

SYMPTOM
  POSSIBLE CAUSE
    CORRECTIVE MAINTENANCE

1. "POWER" INDICATOR DOES NOT ILLUMINATE.
  "POWER" switch not depressed to "ON" position.
    Depress "POWER" switch.
  Electrical power cable assembly not connected to a source of electrical power.
    Connect the electrical power cable assembly to the correct electrical receptacle.
  Electrical power cable assembly is defective.
    Notify your unit's Medical Equipment Repairer.

Table 3-3. Operator/user troubleshooting - continued.

SYMPTOM
- **POSSIBLE CAUSE**
  - **CORRECTIVE MAINTENANCE**

2. "PUMP CYCLE" INDICATOR DOES NOT ILLUMINATE INTERMITTENTLY.
- "PUMP CYCLE" indicator defective (vacuum).
  - Notify your unit's Medical Equipment Repairer.
- "PUMP CYCLE" indicator defective (no vacuum).
  - Notify your unit's Medical Equipment Repairer.

3. "VACUUM SELECT" INDICATOR NOT ILLUMINATED.
- "VACUUM SELECT" indicator(s) defective.
  - Notify your unit's Medical Equipment Repairer.
- Control circuit defective.
  - Notify your unit's Medical Equipment Repairer.

4. NO SUCTION (VACUUM PUMP WORKING).
- Loosen or open tubing connection(s).
  - Check and tighten tubing connections.
- Defective float assembly.
  - Replace float assembly.
- Unserviceable bacteria filter.
  - Replace filter.
- Cap assembly loose.
  - Tighten cap assembly.
- Defective suction and/or suction valve.
  - Notify your unit's Medical Equipment Repairer.

5. LOW SUCTION.
- Loose tubing connections.
  - Tighten tubing connections.
- Defective collection bottle assembly.
  - Notify your unit's Medical Equipment Repairer.
- Defective bacteria filter.
  - Replace bacteria filter.

3-16. Medical Equipment Repairer troubleshooting.

a. Medical Equipment Repairer troubleshooting procedures are provided in table 3-4. Each symptom is followed by possible causes and corrective actions.

Table 3-4. Medical Equipment Repairer troubleshooting.

SYMPTOM
- **POSSIBLE CAUSE**
  - **CORRECTIVE MAINTENANCE**

1. "POWER" INDICATOR DOES NOT ILLUMINATE.
- Electrical power cable assembly is defective.
  - Repair or replace assembly.
- Defective 115-volt electrical receptacle.
  - Notify your unit's power distribution personnel or correct the problem within the International Standards Organization (ISO) shelter.

Table 3-4. Medical Equipment Repairer troubleshooting - continued.

SYMPTOM

POSSIBLE CAUSE

CORRECTIVE MAINTENANCE

Defective "POWER" switch.

Replace switch.

2. "PUMP CYCLE" INDICATOR DOES NOT ILLUMINATE INTERMITTENTLY.

"PUMP CYCLE" indicator defective.

Replace indicator.

Defective PCB control circuit.

Replace PCB.

Defective vacuum pump.

Repair vacuum pump.

Defective pressure or suction valve(s).

Replace pressure or suction valve(s).

3. "VACUUM SELECT" INDICATOR NOT ILLUMINATED.

"VACUUM SELECT" indicator(s) defective.

Replace indicator(s).

Defective "VACUUM SELECT" switch.

Replace switch.

Defective PCB control circuit.

Replace PCB.

4. NO SUCTION (VACUUM PUMP WORKING).

Defective float assembly.

Repair or replace float assembly.

Unserviceable bacteria filter.

Replace filter.

Defective suction or pressure valve(s).

Replace defective valve(s).

Defective PCB control circuit.

Replace PCB.

5. NO SUCTION (VACUUM PUMP NOT WORKING).

Defective PCB control circuit.

Replace PCB.

Unserviceable vacuum pump.

Repair pump.

6. LOW SUCTION.

Defective collection bottle assembly.

Repair or replace assembly.

Defective suction or pressure valve(s).

Test and replace valve(s).

Defective PCB control circuit.

Replace PCB.

Defective vacuum pump heating element.

Replace heating element.

b. An electrical wiring diagram for troubleshooting is provided in figure 3-1.

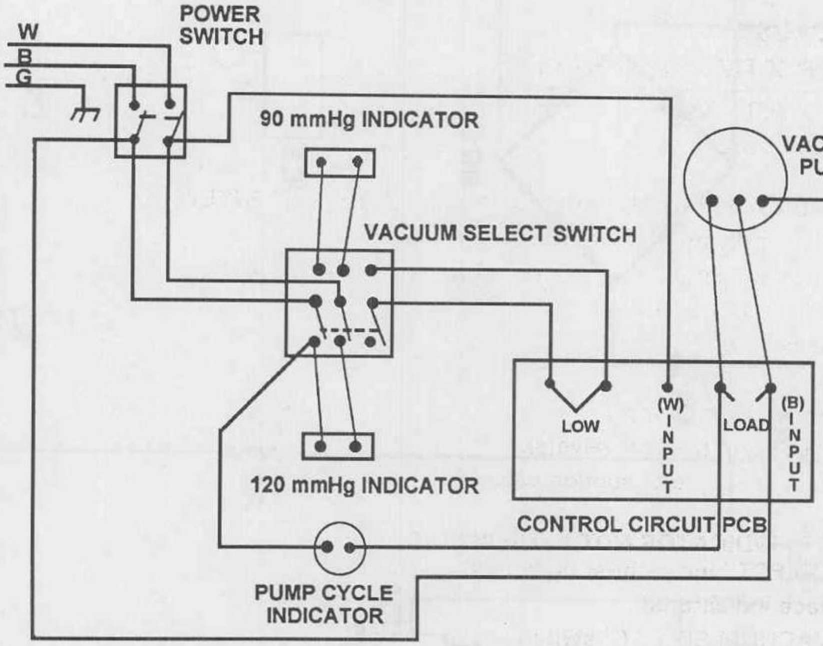

POWER SWITCH
W
B
G
90 mmHg INDICATOR
VACUUM PUMP
VACUUM SELECT SWITCH
LOW
(W) INPUT
LOAD
(B) INPUT
120 mmHg INDICATOR
CONTROL CIRCUIT PCB
PUMP CYCLE INDICATOR

Figure 3-1. Wiring diagram.

Section VII. CIRCUIT DESCRIPTIONS AND ADJUSTMENTS

3-17. General.

a. The schematic diagram and an illustration of the PCB control circuit are provided in figures 3-2 and 3-3 to assist you in understanding the operation of the control circuit.

b. PCB control circuit adjustments are also provided in this section.

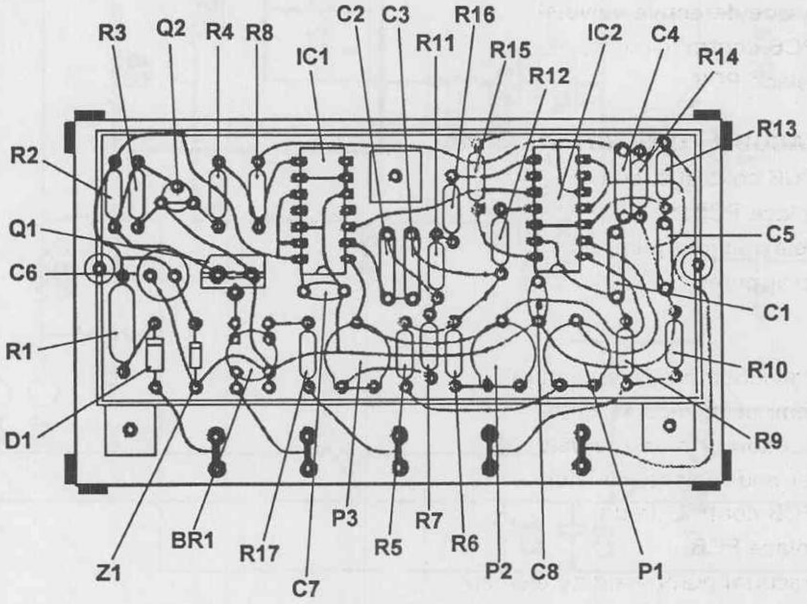
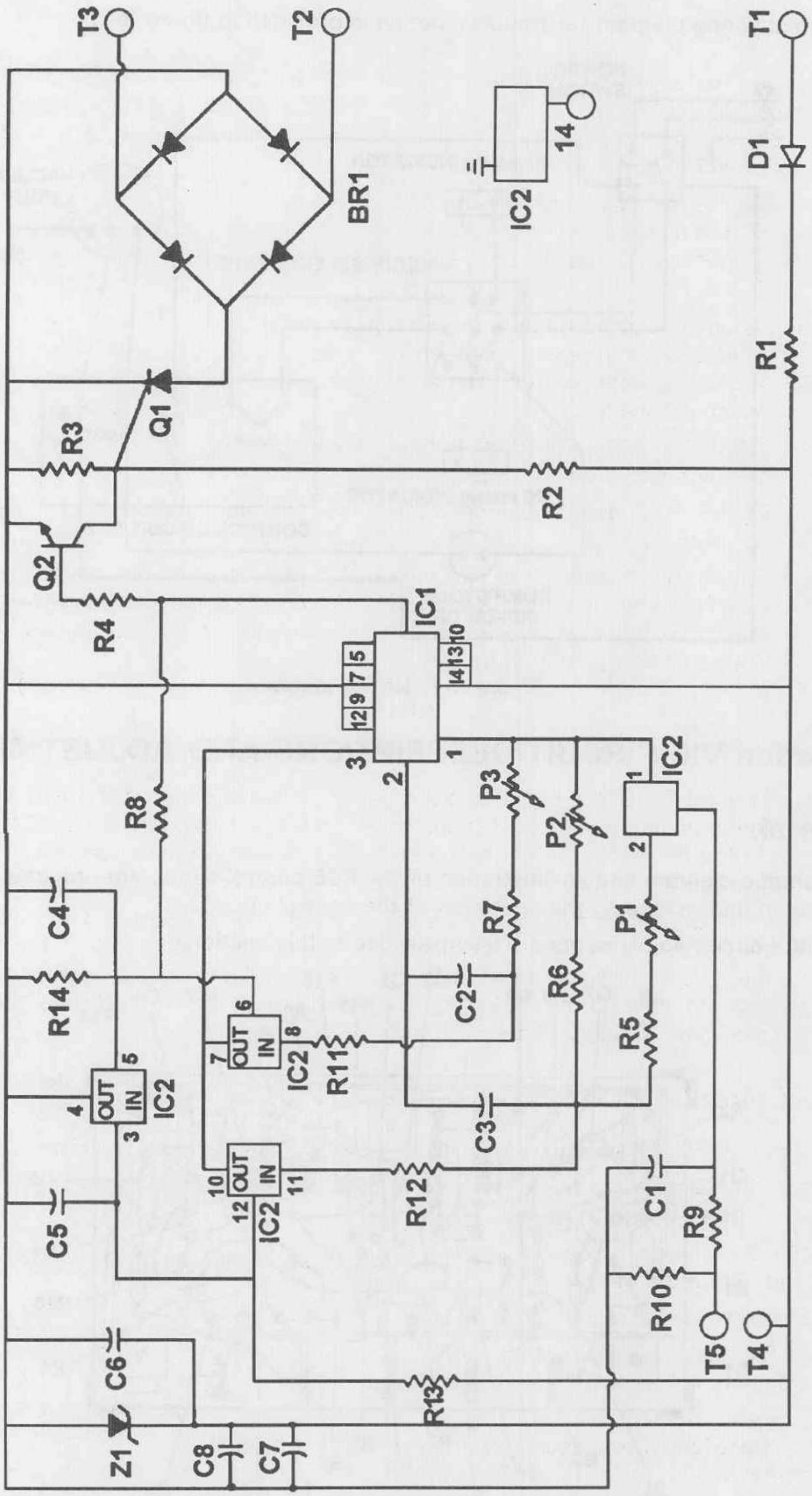

R3
Q2
R4
R8
IC1
C2
C3
R16
R11
R15
R12
IC2
C4
R14
R13
R2
Q1
C6
R1
D1
C5
C1
R10
R9
Z1
BR1
R17
C7
P3
R5
R7
R6
P2
C8
P1

Figure 3-2. Schematic diagram.


T3
T2
T1
BR1
IC2
14
D1
R1
R2
R3
Q1
Q2
R4
IC1
12
9
7
5
14
13
10
3
2
1
R8
P3
P2
P1
IC2
1
2
C4
R14
C2
R7
R6
R5
4
5
OUT
IN
3
IC2
7
6
OUT
IN
8
IC2
R11
C3
10
12
OUT
IN
11
IC2
R12
C1
R9
R10
C5
C6
T5
T4
R13
Z1
C8
C7

Note: R15, R16, and R17 are 0-ohm resistors and do not appear on the schematic.

Figure 3-3. Schematic diagram of PCB.

3-18. Control circuit.

a. The PCB control circuit is an on/off recycling timer which provides a fixed "off time" of 19 to 22 seconds and a selectable "on time" of either 3.40 to 3.75 seconds or 2.10 to 2.25 seconds. The 2.10 to 2.25 second "on time" can be selected by shorting terminals 4 and 5 together. The "on time" period occurs first when electrical power is applied to the input/output terminals.

b. The power supply of the control circuit consists of diode (D1), resistor (R1), capacitors (C6, C7, and C8) and zener diode (Z1) to develop the required +9 VDC. C6 is the filter capacitor for the ½-wave voltage supplied through D1 and R1. Z1 is the voltage regulating zener diode. C7 and C8 are high frequency noise filters.

c. Circuit timing is accomplished by an integrated circuit (IC1). This IC has an integral oscillator chip whose timing components are connected between IC1 pins 1, 2, and 3. The pin 3 connection used is determined by IC2, a quad bilateral switch. The section of this switch that is turned on determines the timing components which are used.

d. Potentiometer (P3), R7, R11, and C2 comprise the timing circuit during the "off time" period. This circuit is activated by a high signal on pin 6, IC2.

e. Components P2, R6, R12, and C3 comprise the longer "on time" period. This circuit is activated by a high signal on pin 12, IC2.

f. P2 and R6, paralleled by P1 and R5, are activated by a high signal on pin 13, IC2 to obtain a shorter "on time" period. Since "on time" is relatively short, R14 (0 ohms) is connected between pin 5, IC2 and common during testing. This prevents the timer (IC1) from going into the "off time" period until both "on time" periods have been adjusted and/or verified.

NOTE

R14 is normally removed from the control circuitry.

g. The output of the timer (IC1) is connected through a full wave bridge (BR1) and a silicon controlled rectifier (SCR) Q1. The gate drive to the SCR is controlled by R2, Q2, R4, and pin 8, IC1. When pin 8, IC1 is low, Q2 is off and gate current is to Q1 through R2. This is the "on time" period. When pin 8, IC1 is high, Q2 is on which shorts the gate current of Q1 to common. This is the "off time" period.

h. The IC1 is controlled to either a high or low state by input on pins 12 and 13. The IC1 is programmed to divide the oscillator frequency by 1,024 for this circuit. Since the Q output of IC1 will change state in one-half of that number of counts, the number 512 is used to calculate the oscillator frequency. Therefore, the oscillator frequency measured at pin 1, IC1 should be 24.98 Hz for the "off time" period, 143.22 Hz for the longer "on time" period, and 227.56 Hz for the short "on time" period.

3-19. Control circuit adjustments.

a. Ensure that the "POWER" switch is in its "OFF" position or depress the switch to its "OFF" position.

b. Ensure that the electrical power cable assembly is disconnected from the 115-volt electrical receptacle.

c. Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

d. Remove the cover. Set it aside.

e. Remove the fish paper cover from the control circuit PCB (fig 3-4) by grasping it lightly with your fingers and pulling upward. Set it aside.

f. Connect the electrical power cable assembly into a 115-volt electrical receptacle.

g. Verify that the components and accessories are in place and assembled in accordance with the procedures contained in paragraph 2-2.

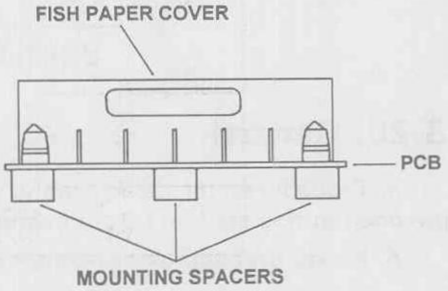


Figure 3-4. PCB cover.

h. Depress the "POWER" switch to the "ON" position.

WARNING

An electrical shock hazard is present with the stainless steel cover removed and the suction apparatus operating.

NOTE

The red indicator within the white "POWER" switch will illuminate.

i. Depress the "VACUUM SELECT" switch for the 90 mmHg level. Verify that the applicable white indicator illuminates.

j. Observe that the "PUMP CYCLE" indicator intermittently illuminates.

k. Time the vacuum pump on cycle with a stopwatch by observing the "PUMP CYCLE" indicator and verify that the vacuum pump on cycle is between 2.10 and 2.25 seconds.

l. If the on cycle is not within the specified range, momentarily shut off the suction apparatus by depressing the "POWER" switch to the "OFF" position and connect a 0-ohm resistor between pin 5, IC2 and common. Depress the "POWER" switch to the "ON" position. Adjust P1 to approximately mid-point (2.65 seconds) by turning P1 clockwise to increase time and counterclockwise to decrease time.

NOTE

The 0-ohm resistor prevents the control circuit from switching to the off cycle until both on cycles are validated or adjusted.

m. Depress the "VACUUM SELECT" switch for the 120 mmHg level. Verify that the applicable white indicator illuminates.

n. Time the vacuum pump on cycle again with a stopwatch by observing the "PUMP CYCLE" indicator and verify that the vacuum pump on cycle is between 3.40 and 3.75 seconds.

o. If the on cycle is not within the specified range, adjust P2 to approximately mid-point (3.60 seconds) by turning P2 clockwise to increase time and counterclockwise to decrease time.

p. Again depress the "POWER" switch to the "OFF" position, remove the 0-ohm resistor, and turn the suction apparatus on by depressing the "POWER" switch to the "ON" position.

q. Time the vacuum pump off cycle and verify that the vacuum pump off cycle is between 19 and 22 seconds.

r. If the off cycle is not within 19 to 22 seconds, adjust P3 to approximately mid-point (20.5 seconds) by turning P3 clockwise to increase time and counterclockwise to decrease time.

s. Depress the "POWER" switch to the "OFF" position.

t. Reinstall the fish paper PCB cover by inserting its end tabs into the mounting holes on each end of the PCB.

u. Reinstall the stainless steel cover.

v. Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

Section VIII. REPAIR PROCEDURES

3-20. General.

a. Procedures for disassembly, repair or replacement of components, services, and reassembly are provided in this section of the manual.

b. Repair procedures are continuous from the first disassembly to the final reassembly step.

WARNING

Hazardous voltages are accessible beneath the control/pump module stainless steel cover when it is removed for testing and/or repairs.

c. Test the suction apparatus after each repair.

3-21. "VACUUM SELECT" switch or "POWER" switch.

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

(5) Remove the stainless steel cover by lifting it upward. Set it aside.

(6) Record the electrical wire colors and their location on the applicable switch.

(7) Remove the electrical wire terminal connectors from the switch.

CAUTION

Do not remove the terminal connectors by pulling on the electrical wires. Grasp the terminal connectors.

(8) Squeeze the switch mounting tabs together and push the switch forward out of its control panel mounting hole.

b. Maintenance service.

(1) Verify that the switch is unserviceable. Discard it.

(2) Acquire a replacement switch.

c. Reassembly.

(1) Orient the replacement switch as illustrated in figure 3-5 and insert it into its mounting hole until its mounting tabs lock it into place.

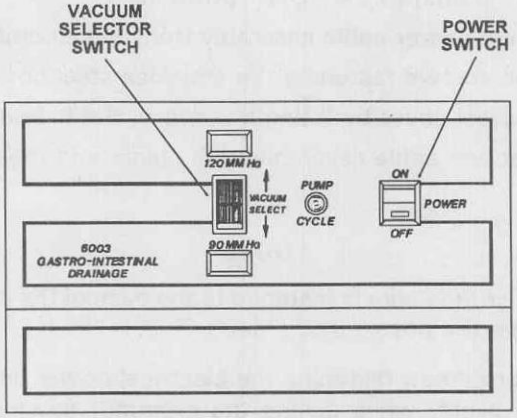


Figure 3-5. Switch orientation.

(2) Reconnect the electrical wire terminal connectors onto the switch in accordance with previously recorded electrical wire color positions.

(3) Reinstall the stainless steel cover.

(4) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

3-22. "VACUUM SELECT" or "PUMP CYCLE" indicator.

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

(5) Record the electrical wire colors and their location on the applicable indicator.

(6) Remove the electrical wire terminal connectors from the indicator.

CAUTION

Do not remove the terminal connectors by pulling on the electrical wires. Grasp the terminal connectors.

(7) Squeeze the indicator mounting tabs together and push the indicator forward out of its control panel mounting hole.

b. Maintenance service.

(1) Verify that the indicator is unserviceable. Discard it.

(2) Acquire a replacement indicator.

c. Reassembly.

(1) Insert the replacement indicator into its mounting hole until its mounting tabs lock it into place.

(2) Reconnect the electrical wire terminal connectors onto the indicator in accordance with the previously recorded electrical wire color positions.

(3) Reinstall the stainless steel cover.

(4) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

3-23. Electrical power cable assembly.

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Remove the six Phillips screws fastening the stainless steel cover. Set them aside.

(4) Remove the stainless steel cover by lifting it upward. Set it aside.

(5) Record the electrical power cable assembly wire colors and their connections.

(6) Remove the wires.

NOTE

The green, electrical ground wire is fastened to the base of the control/pump module by a hex nut. Remove the nut.

(7) Pinch the strain relief grommet, fastening the electrical power cable assembly into the bottom of the control/pump module, with pliers, while pulling the grommet downward from the underside of the module.

(8) Pull the electrical power cable out of the control/pump module.

b. Maintenance services.

(1) Acquire a replacement electrical power cable assembly.

NOTE

A replacement strain relief grommet may also be required.

(2) Prepare the replacement electrical power cable assembly to meet the requirements of the replaced electrical power cable assembly. For example, spade terminals, electrical ground wire ring terminal, etc.

(3) Insert the electrical cable into the strain relief grommet allowing sufficient cable length for connections inside the control/pump module.

(4) Squeeze the strain relief grommet with pliers while pushing it upward into its mounting hole in the bottom of the control/pump module.

(5) Reconnect the electrical wire terminal connectors in accordance with previously recorded electrical wire colors and locations.

(6) Reinstall the stainless steel cover.

(7) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

(8) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

3-24. Suction or pressure valve (fig 3-6).

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

(5) Remove the stainless steel cover by lifting it upward. Set it aside.

(6) Disconnect the white silicone rubber tubing from the vacuum pump cylinder barb.

(7) Disconnect the PVC tubing from the bacteria filter connector barb.

(8) Remove the valve and manifold assembly out of the suction apparatus.

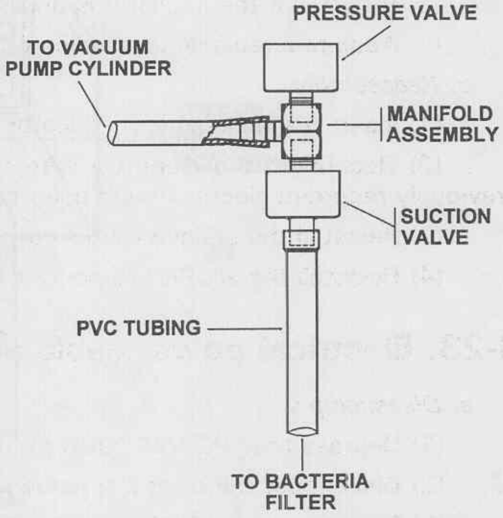


Figure 3-6. Suction and pressure valves.

b. Maintenance services.

(1) Disconnect the PVC tubing from the suction valve. Set it aside.

(2) Unscrew the defective valve(s) from the manifold assembly. Discard the defective valve(s).

NOTE

The suction and pressure valves are factory sealed units which cannot be economically repaired.

(3) Inspect the silicone rubber tubing and the PVC tubing for serviceability.

(4) Acquire replacement valves and/or tubing.

(5) Lubricate the threads of the replacement valves lightly with petroleum jelly or an equivalent material.

(6) Screw the replacement valve(s) into the manifold assembly.

CAUTION

Avoid excessive tightening of the valves into the manifold assembly. Use only your fingers.

(7) Reinstall serviceable PVC tubing onto the suction valve.

(8) Reinstall serviceable silicone rubber tubing onto the manifold assembly.

c. Reassembly.

(1) Reposition the valve and manifold assembly into the suction apparatus.

(2) Reconnect the PVC tubing from the suction valve to the bacteria filter mounting barb.

(3) Reconnect the silicone rubber tubing from the manifold assembly to the vacuum pump cylinder barb.

(4) Reinstall the stainless steel cover.

(5) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

3-25. Bacteria filter (fig 3-7).

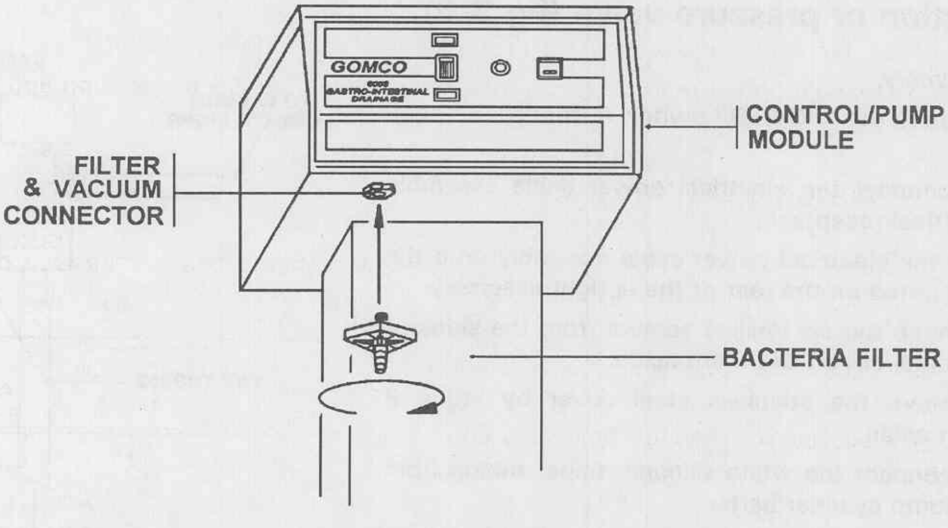


Figure 3-7. Bacteria filter.

a. Disassembly.

(1) Disconnect the PVC tubing from the bacteria filter connector barb.

(2) Unscrew the bacteria filter by turning it counterclockwise.

b. Maintenance services. Acquire a replacement bacteria filter.

NOTE

The bacteria filter is factory sealed and cannot be refurbished.

c. Reassembly.

(1) Screw the replacement filter into the filter and vacuum connector by turning it clockwise.

CAUTION

Do not tighten the bacteria filter excessively to prevent damage to the threads.

(2) Reconnect the PVC tubing to the bacteria filter connector barb.

3-26. Casters.

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the collection bottle assembly.

(5) Grasp the handle on the rear of the control/pump module and gently tip the suction apparatus over and lower it to the floor.

(6) Grasp the caster and pull outward to remove it from its mounting socket.

NOTE

Two casters include a brake and these may be located as desired for convenient access.

b. Maintenance services. Acquire a replacement caster or casters.

c. Reassembly.

(1) Grasp the replacement caster and push it tightly into its mounting socket.

(2) Grasp the handle on the rear of the control/pump module and lift the suction apparatus onto its casters.

3-27. Control circuit PCB (fig 3-8).

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

(5) Remove the stainless steel cover by lifting it upward. Set it aside.

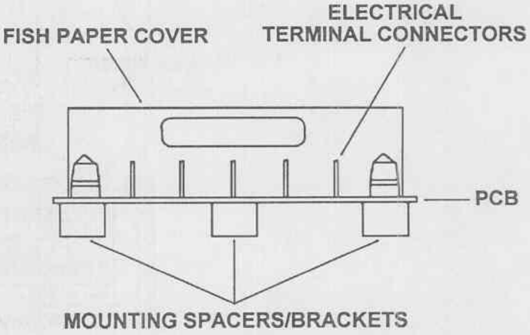


Figure 3-8. Control circuit PCB.

(6) Grasp the fish paper cover on the control circuit PCB and pull upward to remove it. Set it aside.

(7) Record the electrical wire colors and their terminal connector positions on the control circuit PCB.

(8) Remove the electrical wire terminal connectors from the PCB.

CAUTION

Do not remove the terminal connectors by pulling on the electrical wires. Grasp the terminal connectors.

(9) Remove the two Phillips screws from the underside of the control/pump module to unfasten the PCB. Set them aside.

(10) Remove the PCB by grasping it by the edges and lifting it out of the control/pump module.

b. Maintenance services. Acquire a replacement PCB.

c. Reassembly.

(1) Position the control circuit PCB over its mounting holes in the base of the control/pump module.

(2) Reinstall the two Phillips screws into the mounting spacers/brackets on the PCB from the underside of the control/pump module.

(3) Reinstall the terminal connectors onto the PCB in accordance with previously recorded electrical wire color positions.

(4) Reinstall the fish paper PCB cover by inserting its end tabs into the mounting holes on each end of the PCB.

(5) Reinstall the stainless steel cover.

(6) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

3-28. Vacuum pump (fig 3-9).

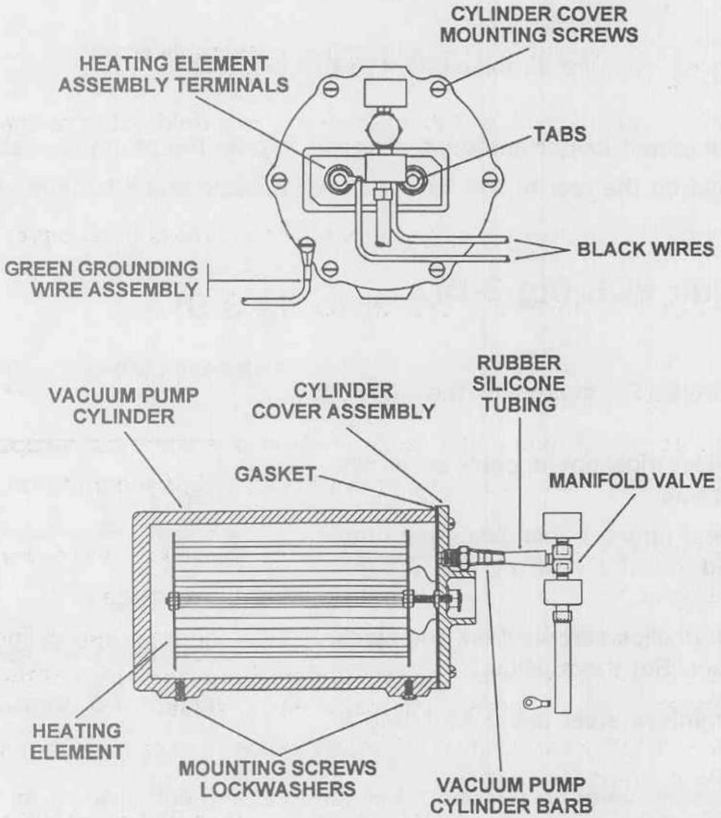

CYLINDER COVER MOUNTING SCREWS
HEATING ELEMENT ASSEMBLY TERMINALS
TABS
BLACK WIRES
GREEN GROUNDING WIRE ASSEMBLY
RUBBER SILICONE TUBING
VACUUM PUMP CYLINDER
CYLINDER COVER ASSEMBLY
GASKET
MANIFOLD VALVE
HEATING ELEMENT
MOUNTING SCREWS LOCKWASHERS
VACUUM PUMP CYLINDER BARB

Figure 3-9. Vacuum pump.

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

(5) Remove the stainless steel cover by lifting it upward. Set it aside.

(6) Disconnect the white silicone rubber tubing from the vacuum pump cylinder barb.

(7) Remove the two slotted screws and lockwashers from the underside of the control/pump module to unfasten the vacuum pump. Set the screws and lockwashers aside.

(8) Unsolder the two black wires from the heating element assembly terminals recessed into the vacuum pump cylinder cover assembly.

(9) Remove the green grounding wire by unscrewing the green Phillips screw from the cylinder cover assembly.

(10) Lift the vacuum pump up and out of the control/pump module.

b. Maintenance services. Acquire a replacement vacuum pump.

c. Reassembly.

(1) Position the replacement vacuum pump into the control/pump module and align its mounting screw holes with the mounting holes in the base of the module.

(2) Reinstall the two slotted screws and lockwashers to refasten the vacuum pump.

(3) Reinstall the green grounding wire onto the cylinder cover assembly by fastening it with a Phillips screw.

(4) Solder the two black wires onto the heating element assembly terminals recessed into the vacuum pump cylinder cover assembly.

(5) Reattach the white silicone rubber tubing from the manifold valve to the vacuum pump tubing barb.

(6) Reinstall the stainless steel cover.

(7) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

3-29. Heating element assembly (refer to fig 3-9).

a. Disassembly.

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Remove the six Phillips screws from the sides of the stainless steel cover. Set them aside.

(5) Remove the stainless steel cover by lifting it upward. Set it aside.

(6) Disconnect the white silicone rubber tubing from the vacuum pump cylinder barb.

(7) Remove the two slotted screws and lockwashers from the underside of the control/pump module to unfasten the vacuum pump. Set the screws and lockwashers aside.

(8) Unsolder the two black wires from the heating element assembly terminals recessed into the vacuum pump cylinder cover assembly.

(9) Remove the green grounding wire by unscrewing the green Phillips screw from the cylinder cover assembly.

(10) Lift the vacuum pump up and out of the control/pump module. Set it on a work surface.

(11) Remove the six Phillips screws fastening the vacuum pump cylinder cover assembly to the vacuum pump cylinder.

CAUTION

Hold the vacuum pump cylinder cover assembly in place as you remove the last two Phillips screws to prevent its movement.

(12) Tap the edge of the vacuum pump cylinder cover assembly with a plastic mallet to break it free of the gasket, if required.

(13) Grasp the edge of the cylinder cover assembly with your fingers and slowly lift it and the attached heating element (fig 3-10) out of the cylinder.

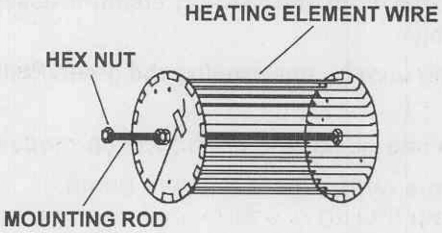


Figure 3-10. Heating element.

(14) Unsolder the two heating element wires from the cylinder cover assembly terminals and pry up the small metal tabs mechanically holding the heating element wires.

NOTE

The centers of the electrical terminals should be free of solder.

(15) Loosen the hex nut locking the heating element mounting rod to the cylinder cover assembly and unscrew the heating element.

(16) Remove the cylinder cover gasket.

b. Maintenance services.

(1) Inspect the inside of the vacuum pump cylinder and clean it, if required.

(2) Inspect the vacuum pump cylinder cover gasket for serviceability as well as the surfaces of the vacuum pump cylinder and cover touched by the gasket. Clean the surfaces as required.

NOTE

Gasket replacement is recommended.

(3) Acquire a replacement heating element assembly and a gasket as required.

c. Reassembly.

(1) Screw the rod of a replacement heating element into its mounting hole in the center of the cylinder cover assembly.

NOTE

Ensure that the heating element rod is flush with the outside surface of the cylinder cover assembly.

(2) Tighten the hex nut on the heating element rod against the cylinder cover assembly.

(3) Thread the two heating element wires through the electrical terminal holes in the cylinder cover assembly and wind each wire around the terminal tabs.

(4) Bend the tabs down to physically fasten the wires.

(5) Solder the electrical terminals.

(6) Test the electrical resistance between the terminals with an ohmmeter for 155 to 160 ohms.

(7) Apply a small drop of sealing material on the heating element mounting rod to prevent a leak.

(8) Place the vacuum pump cylinder on a work surface with its chamber facing upward.

(9) Place the gasket onto the vacuum pump cylinder and align its holes with the vacuum pump cylinder's mounting holes.

(10) Insert the heating element assembly into the vacuum pump cylinder and align the mounting holes with those in the gasket and the vacuum pump cylinder.

(11) Reinstall the six Phillips screws to fasten the vacuum pump cylinder cover onto the vacuum pump cylinder.

(12) Solder the two black wires onto the heating element assembly terminals recessed into the vacuum pump cylinder cover assembly.

(13) Reinstall the green grounding wire onto the vacuum pump cylinder cover assembly by fastening it with a Phillips screw.

(14) Position the vacuum pump into the control/pump module and align its mounting screw holes with the mounting holes in the base of the module.

(15) Reinstall the two slotted screws and lockwashers to refasten the vacuum pump.

(16) Reattach the white silicone rubber tubing from the manifold valve to the vacuum pump tubing barb.

(17) Reinstall the stainless steel cover.

(18) Reinstall the six Phillips screws into the sides of the stainless steel cover to refasten it.

3-30. Other components.

Disassembly and reassembly of the suction apparatus to repair or replace other components such as the electrical cable clips, collection bottle assembly brackets, and the transformer do not require detailed instructions.

Section IX. VOLTAGE CONVERSION INSTRUCTIONS

3-31. General.

a. This section of the manual contains the procedures for changing the source of electrical power for operation of the suction apparatus on 230 volts.

b. Electrical connections for 115-volt and 230-volt use are illustrated in figure 3-13.

NOTE

The decal on the top of the transformer should reflect 230 V, not 220 V.

3-32. Procedures for 115-volt use.

a. Ensure that the "POWER" switch is in its "OFF" position or depress the switch to its "OFF" position.

b. Remove the coiled electrical power cable assembly from the cable clips mounted on the rear of the upright assembly.

NOTE

The uncoiled electrical power cable assembly is connected to the underside of the control/pump module in the right rear corner. The electrical power cable assembly for the transformer should remain coiled on the cable clips on the right side of the upright assembly.

c. Connect the electrical power cable assembly into a 115-volt electrical receptacle.

3-33. Conversion procedures (115 volts to 230 volts).

a. Ensure that the "POWER" switch is in its "OFF" position or depress the switch to its "OFF" position.

b. Remove the coiled electrical power cable assembly from the cable clips mounted on the rear of the upright assembly. Then, connect it into the 115-volt electrical receptacle on the rear of the transformer.

c. Remove the coiled electrical power cable assembly from the cable clips mounted on the right side of the upright assembly.

d. Connect the electrical power cable assembly into a 230-volt electrical receptacle.

NOTE

The connector on the 230-volt electrical power cable assembly may require replacement to conform to the available 230-volt electrical receptacle.

Section X. STORING AND SHIPPING PROCEDURES

3-34. General.

This section contains the procedures for preparing the suction apparatus for storing and shipping.

3-35. Preparation for storing.

a. Shut down procedures for the suction apparatus are as follows:

(1) Depress the "POWER" switch to the "OFF" position.

(2) Disconnect the electrical power cable assembly from the electrical receptacle.

(3) Coil the electrical power cable assembly onto the cable clips mounted on the rear of the upright assembly.

(4) Ensure that the electrical power cable assembly from the step-down transformer is coiled onto the cable clips mounted on the right side of the upright assembly.

(5) Clean, disinfect, and sterilize the suction apparatus and components in accordance with the procedures in chapter 2, section V.

b. Inventory the components. Replace unserviceable or missing items.

c. Pack the components and manufacturer's manuals into a small container.

d. Place the shipping container base on a flat surface and lift the suction apparatus onto it.

e. Place the foam blocks under the base assembly of the suction apparatus.

f. Lift the shipping container body over the suction apparatus and lower it around the suction apparatus. Ensure that the shipping container body is inside the shipping container base.

g. Close the top flaps of the shipping container.

h. Install appropriate strapping or tape vertically around the shipping container base and body.

3-36. Preparation for shipping.

a. The suction apparatus, packed in the original shipping carton, is suitable for shipping.

b. The suction apparatus, packed in a military chest or other available container, will be appropriately packed for shipping. Notify your unit transportation point for assistance, if necessary.

CHAPTER 4

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

Section I. GENERAL INFORMATION

4-1. Overview.

This chapter provides for maintenance that is beyond the capability, capacity, and authorization for unit level maintenance personnel. The procedures in this chapter will not be attempted at the unit level.

4-2. Tools and test equipment.

Common tools and test equipment required for support maintenance of the equipment are listed in appendix B, section III. Refer to your unit's MTOE or installation table of distribution and allowances (TDA) for authorized items.

4-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III.

4-4. Expendable supplies.

Expendable and durable supplies and materials for support maintenance are listed in appendix D, section II.

4-5. Repair parts.

Repair parts required for support maintenance are listed in appendix E, section II.

4-6. Special tools.

Special tools required for support maintenance are listed in appendix E, section III.

Section II. MAINTENANCE PROCEDURES

4-7. General.

a. There are no specific troubleshooting procedures for DS/GS levels of maintenance.

b. Repair procedures for the PCB have not been developed.

APPENDIX A

REFERENCES

A-1. Army regulations.

AR 40-61	Medical Logistics Policies and Procedures
AR 710-2	Supply Policy Below the Wholesale Level
AR 725-50	Requisitioning, Receipt, and Issue System
AR 750-1	Army Materiel Maintenance Policy and Retail Maintenance Operations

A-2. Technical manual.

TM-DPSC-6500-RPL	Medical Materiel: Medical Repair Parts Reference List

A-3. Technical bulletins.

TB MED 7	Maintenance Expenditure Limits for Medical Materiel
TB 8-6500-MPL	Mandatory Parts List for Medical Equipment
TB 38-750-2	Maintenance Management Procedures for Medical Equipment
TB 740-10/DLAM 4155.5/AFR 67-43	Quality Control, Depot Storage Standards, Appendix M, Medical Supplies

A-4. Field manual.

FM 21-11	First Aid for Soldiers

A-5. Supply bulletin.

SB 8-75-( )-series	Army Medical Department Supply Information

A-6. Other publications.

(These publications may be obtained from Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001.)

Maintenance and Service Manual (May 1987), Allied Healthcare Products, Inc., GOMCO Division, 1720 Sublette Avenue, St. Louis, MO 63110.

Operation Manual (August 1990), Allied Healthcare Products, Inc., GOMCO Division, 1720 Sublette Avenue, St. Louis, MO 63110.

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance levels.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance function.

B-2. Explanation of columns in section II.

a. Group Number, Column 1. The assembly group number (Group No.) column is a numerical group assigned to each assembly. The applicable assembly groups are listed in the maintenance allocation chart (MAC) in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Assembly Group, Column 2. This column contains a brief description of the components of each assembly group.

c. Maintenance Functions, Column 3. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance level authorized to perform these functions. The symbol designations for the various maintenance levels are as follows:

C - Operator or crew
O - Unit maintenance
F - Direct support maintenance
H - General support maintenance
D - Depot maintenance

The maintenance functions are defined as follows:

A - Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B - Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C - Service. To clean, to preserve, to charge, and to add lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

D - Adjust. To rectify to the extent necessary to bring into proper operating range.

E - Align. To adjust specified variable elements of an item to bring it to optimum performance.

F - Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G - Install. To set for use in an operational environment such as tents or International Standards Organization shelters.

H - Replace. To replace unserviceable items with serviceable like items.

I - Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage to a specific failure. Repair may be accomplished at each level of maintenance.

J - Overhaul. Normally the highest degree of maintenance performed by the Army in order to minimize time work in process consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by a maintenance standard in technical publications for each item of equipment. Overhaul normally does not return an item to like new condition.

K - Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance level.

d. Tools and Equipment, Column 4. This column is provided for referencing by code, the tools and test equipment (sec III) required to perform the maintenance functions.

e. Remarks, Column 5. This column is provided for referencing by code, the remarks (sec IV) pertinent to the maintenance functions.

B-3. Explanation of columns in section III.

a. Reference Code, Column 1. This column correlates to section II, column 4.

b. Maintenance Level, Column 2. This column identifies the maintenance levels using the tools and test equipment.

c. Nomenclature, Column 3. This column identifies the tools and test equipment.

d. National Stock Number, Column 4. This column provides the national stock number of the specific tools or test equipment.

B-4. Explanation of columns in section IV.

a. Reference Code, Column 1. This column correlates to section II, column 5.

b. Remarks, Column 2. This column provides supplemental information or explanatory notes pertinent to the maintenance function in section II.

Section II. MAINTENANCE ALLOCATION CHART FOR SUCTION APPARATUS

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
00	Suction Apparatus	O 0.3	O 0.5		O 0.6				O 0.3	O 1.1	F 3.0	D 6.5	01,02,03, 04,05,06, 07,08,09, 10	A,B
01	Control/Pump Module												01,02,03, 04,05,06, 07,08,09, 10	A,B
	Vacuum Select Indicators	O 0.1							O 0.3					
	Vacuum Select Switch		O 0.2						O 0.3					
	Pump Cycle Indicator		O 0.3						O 0.3					
	Power Switch		O 0.3						O 0.3					
	Electrical Power Cable Assembly		O 0.2						O 0.3					
	Vacuum Pump	O 0.3	O 0.3	O 0.4					O 0.6	O 1.0				
	Control Panel	O 0.1							O 1.1					
	Housing	O 0.2								D 3.2				
	Control PCB								O 0.4			D 1.7		
	Manifold	O 0.2							O 0.4					

Section II. MAINTENANCE ALLOCATION CHART FOR SUCTION APPARATUS

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
	Suction Valve		O 0.3											
	Pressure Valve		O 0.3											
	Bacteria Filter	O 0.1												
02	Upright Assembly												01,02	A
	Housing	O 0.2							D 1.0	D 1.2				
	Cable Clips	O 0.1							O 0.2					
03	Base Assembly												01,02,03, 04	A,B
	Housing	O 0.1							D 1.2	D 0.9				
	Casters	O 0.1							O 0.3	O 0.1				
	Transformer	O 0.3							O 0.3	O 0.2				

Section III. TOOLS AND TEST EQUIPMENT FOR SUCTION APPARATUS

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER
01	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Repairmans	5180-00-611-7923
02	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Organizational	5180-00-611-7924
03	O,F,H,D	Multimeter, UN/USM 486	6625-01-145-2430
		or	
		Multimeter, AN/PSM 45A	6625-01-265-6000
04	O,F,H,D	Tester, Current Leakage, TS 2514/P	6625-01-142-8233
05	F,H,D	Tester, Semiconductor, TS 1836 D/U	6625-00-138-7320
06	O,F,H,D	Calibrator-Analyzer, Hospital Equipment (Test Vacuum Gauge/Test Flowmeter)	6695-01-255-2855
07	F,H,D	Oscilloscope, AN/USM 488	6525-01-187-7847
		or	
		Oscilloscope, OS262(P)/U w/Amplifier, Dual Trace, AM6785/U w/Time Base, Dual Trace, TD1159/U	6625-01-007-9416 6625-00-361-5318 6625-00-261-5139
		or	
		Oscilloscope, OS291/G	6625-01-258-0022
08	F,H,D	Test Set, Circuit Component, TS4138/P	6625-01-255-0839
09	F,H,D	Generator, Signal, SG1171A/U	6625-01-216-9684
10	F,H,D	Counter, Electronic, Digital, AN/USM 459	6625-01-271-3012

Section IV. REMARKS
FOR
SUCTION APPARATUS

(1) REFERENCE CODE	(2) REMARKS
A	Tools and test equipment are listed for each assembly group.
B	Perform an annual electrical safety inspection and test. Perform the inspection and test after repair or replacement of electrical/electronic components.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the equipment to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items lists are divided into the following sections.

a. Section II. Components of End Item. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the equipment in operation, to operate it, and to perform emergency repairs. Basic issue items must be with the equipment during operation and whenever it is transferred between property accounts. This manual is your authority to request or requisition basic issue items, based on MTOE authorization of the end item.

C-3. Explanation of columns.

The following provides an explanation of columns found in both listings:

a. Item Number, Column 1. This column indicates the item number assigned to the item.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the commercial and government entity (CAGE) code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation. These abbreviations are listed in the glossary.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) provided with the equipment.

Section II. COMPONENTS OF END ITEM FOR SUCTION APPARATUS

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1	6120-01-280-0561	Transformer, Step-down (25415) 01-90-3726	EA	1
2	6515-01-382-4482	Collection Bottle Assembly (25415) 01-90-3936	EA	1

Section III. BASIC ISSUE ITEMS FOR SUCTION APPARATUS

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1	4820-01-383-0560	Valve and Manifold Assembly (25415) 01-90-2725	EA	1
2	6515-01-191-0859	Bacteria Filter (25415) 01-90-3100	PG	1
3	6515-01-346-1167	Tubing (25415) 01-90-2000	PG	1
4		Maintenance and Service Manual (May 1987) (25415) None	EA	2
5		Operation Manual (August 1990) (25415) S168-227-001	EA	2

APPENDIX D

EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope.

This appendix lists expendable and durable supplies and materials that are required to maintain the equipment. This listing is authorization to requisition and retain the items if not otherwise authorized.

D-2. Explanation of columns.

a. Item Number, Column 1. The item number (Item No.) is sequentially assigned.

b. Level, Column 2. This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. National Stock Number, Column 3. This column indicates the national stock number assigned to the item.

d. Description, Column 4. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. Unit of Measure, Column 5. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by an alphabetical abbreviation. These abbreviations are listed in the glossary.

f. Quantity, Column 6. This column indicates the quantity (QTY) of the item(s) provided with the equipment.

Section II. EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST FOR DRAINAGE UNIT

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEASURE	(6) QTY
1	O	7920-01-004-7847	Cloth, Cleaning (97327) Rymple Cloth 301	RO	1
2	O	5970-00-419-4290	Tape, Insulation, Electrical (81349) MIL-I-24391	RO	1
3	O	6840-00-783-0050	Disinfectant, Spray, 7 oz (73820) Lysolspray	CN	AR
4	O	6840-00-782-2691	Disinfectant, Liquid, 1 gal (58536) A-A-1140	EA	AR

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

E-1. Scope.

This manual lists spare and repair parts, special tools, special test equipment; and other special support equipment required for the performance of unit level, direct support, general support, and depot level maintenance. It authorizes the requisitioning and issue of spare and repair parts in consonance with the MAC (app B).

E-2. General.

The Repair Parts and Special Tools List is divided into the following sections:

a. Repair Parts, Section II. A list of repair parts authorized for the performance of maintenance in figure number and item number sequence.

b. Special Tools, Test, and Support Equipment, Section III. A list of special tools, test, and support equipment authorized for the performance of maintenance.

E-3. Explanation of columns in section II.

a. Illustration, Column 1.

(1) *Figure Number.* This column indicates the figure number (FIG NO.) of the illustration on which the item is shown.

(2) *Item Number.* This column indicates the item number (ITEM NO.) used to identify each item on the illustration.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name of the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) to be used with or on the illustrated component, assembly, module, or end item.

E-4. Explanation of columns in section III.

a. Item Number, Column 1. This number is sequentially assigned.

b. Level, Column 2. This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. National Stock Number, Column 3. This column indicates the national stock number assigned to the item.

d. Description, Column 4. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. Unit of Measure, Column 5. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

f. Quantity, Column 6. This column indicates the quantity (QTY) of the item(s) to be used with or on the illustrated component, assembly, module, or end item.

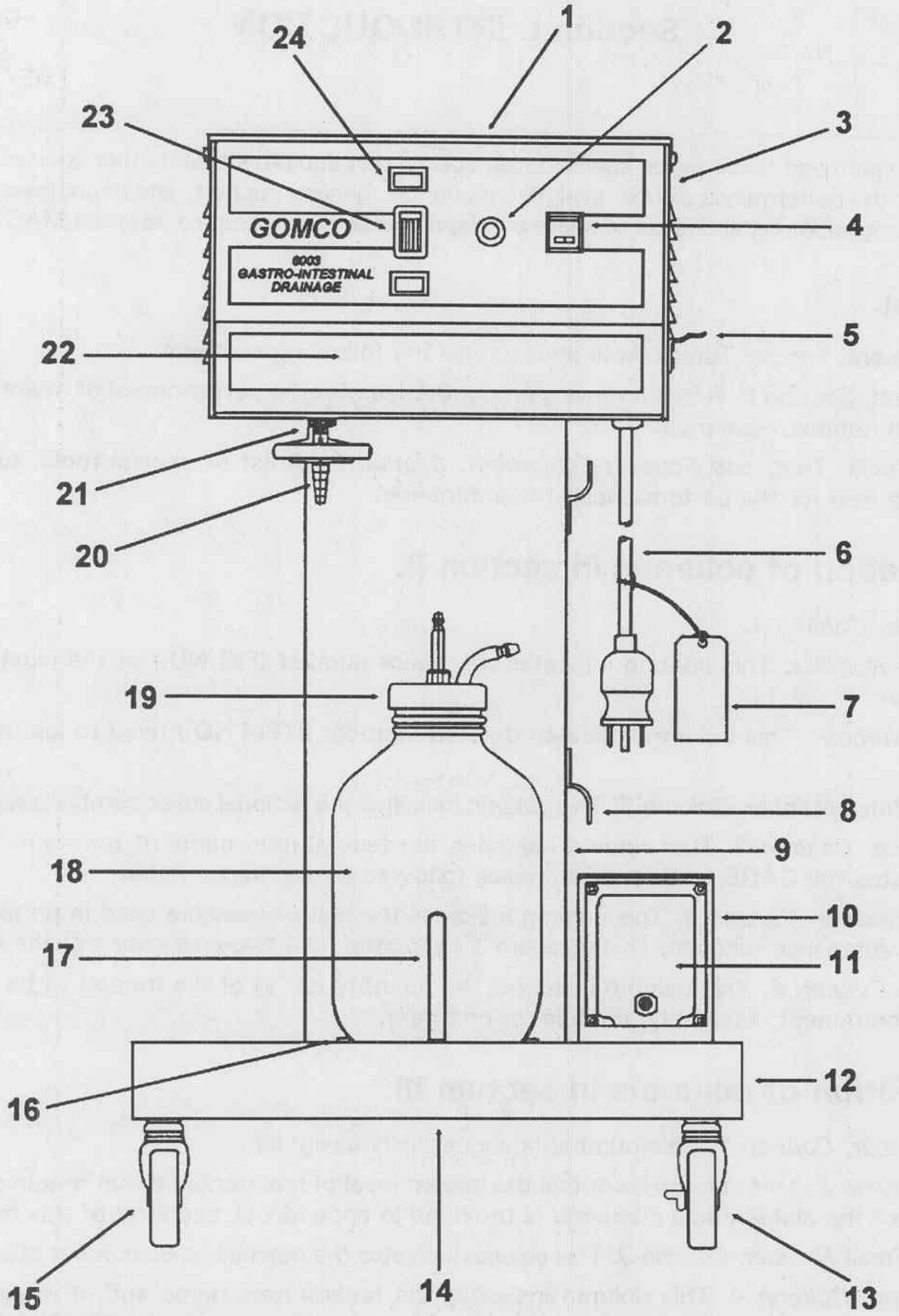

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Figure E-1. Suction apparatus components.

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION FIG NO.	ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
E-1	1		Cover, Stainless Steel (25415) 01-90-2573	EA	1
E-1	2	6515-01-198-7600	Pump Cycle Lamp (25415) 01-90-2310	EA	1
E-1	3		Control/Pump Module (25415) 01-90-2570	EA	1
E-1	4	5930-01-279-2387	Power Switch (25415) 01-90-2304	EA	1
E-1	5		Devilbiss Hook (25415) 01-90-2742	EA	1
E-1	6		Electrical Power Cord Assembly (115-volt) (25415) 01-90-2737	EA	1
E-1	7		Tag, Grounding Instructions (25415) 01-90-2340-2	EA	1
E-1	8		Cable Clip (25415) 01-90-1294	EA	4
E-1	9		Upright Assembly (25415) 01-90-3932	EA	1
E-1	10		Cover, Transformer (25415) 01-90-3886	EA	1
E-1	11	6120-01-280-0561	Transformer, Step-down (25415) 01-90-3726	EA	1
E-1	12		Bumper, Rubber (25415) 01-90-2816	EA	1
E-1	13		Caster, w/Brake (25415) 01-90-3922	EA	2
E-1	14		Base Assembly (25415) 01-90-3931	EA	1
E-1	15		Caster, w/o Brake (25415) 01-90-3921	EA	2
E-1	16		Pad, Bottle (25415) 01-90-2001	EA	1
E-1	17		Bracket, Bottle (25415) 01-90-2697	EA	3

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-1	18	6515-01-382-4482	Bottle, 2800 ML (25415) 01-90-3105	EA	1
E-1	19		Cap and Float Assembly (25415) 01-90-3487	EA	1
E-1	20	6515-01-280-0586	Bacteria Filter (3) (25415) 01-90-3100	PG	1
E-1	21		Filter and Vacuum Connector (25415) 01-90-2765	EA	1
E-1	22		Panel, Front (25415) 01-90-3713	EA	1
E-1	23	5930-01-279-2388	Vacuum Select Switch (25415) 01-90-3719	EA	1
E-1	24	6240-01-279-2391	Vacuum Select Indicator (25415) 01-90-3588	EA	2
E-1	*		Warning Decal (25415) 01-90-3263	EA	1
E-1	*		Voltage Conversion Decal (25415) 01-90-3941	EA	1
E-1	*		Socket, Caster (25415) 01-90-2908	EA	4
E-1	**		Front Panel Assembly (25415) 01-90-3721	EA	1

* Not illustrated.

** Includes items 2, 4, 22, 23, and 24.

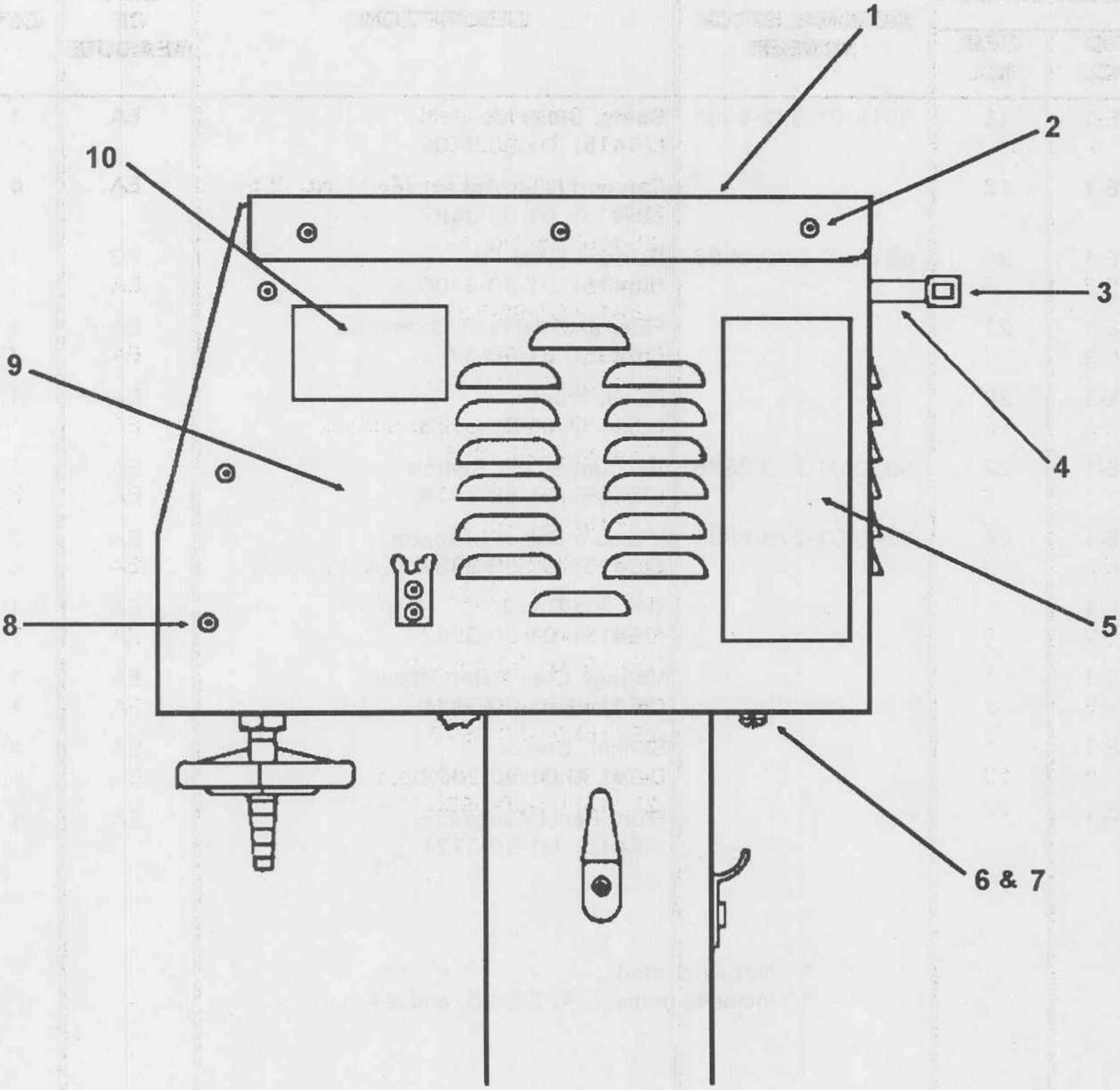
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Figure E-2. Control/pump module components.

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-2	1		Cover, Stainless Steel (25415) 01-90-2573	EA	1
E-2	2		Screw, Phillips, Sheet Metal, No. 8 by 3/8-in (25415) Ref No. 4	EA	6
E-2	3		Handle (25415) 01-90-2271	EA	1
E-2	4		Spacer, Handle (25415) 01-90-2270	EA	2
E-2	5		Decal, Operational Instructions (25415) 01-90-3940	EA	1
E-2	6		Lockwasher, No. 10 (25415) Ref No. 18	EA	5
E-2	7		Screw, Slotted, 10 - 32 by 7/16-in (25415) Ref No. 24	EA	2
E-2	8		Rivet, Plated (25415) 01-90-2604-2	EA	7
E-2	9		Control/Pump Module (25415) 01-90-2570	EA	1
E-2	10		Decal, Manufacturer Data (25415) 01-90-3938	EA	1

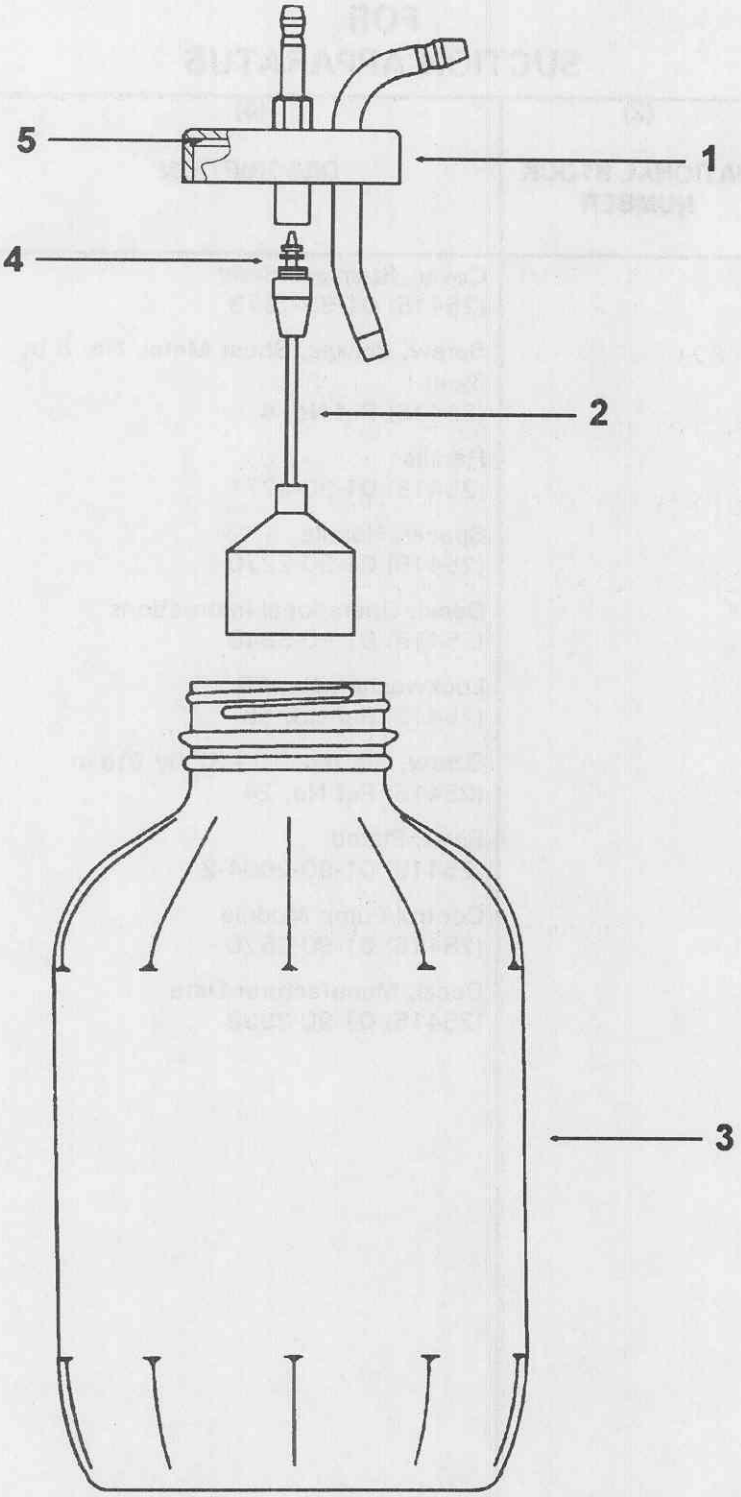

Figure E-3. Collection bottle assembly components.

Section II. REPAIR PARTS LIST
FOR
SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-3	1	5340-01-377-5465	Cap w/Gasket (25415) 01-90-2393	EA	1
E-3	2	6680-01-372-7784	Float Assembly (25415) 01-90-3486	EA	1
E-3	3	6515-01-382-4482	Bottle, 2800 mL (25415) 01-90-3105	EA	1
E-3	4	5310-01-187-7753	Gasket, Float (25415) 01-90-2395	EA	1
E-3	5	5330-01-191-0914	Gasket, Cap (25415) 01-90-2394	EA	1
E-3	**		Cap and Float Assembly (25415) 01-90-3487	EA	1
E-3	***		Collection Bottle Assembly (25415) 01-90-3936	EA	1

** Includes items 1 and 2.
*** Includes items 1, 2, and 3.

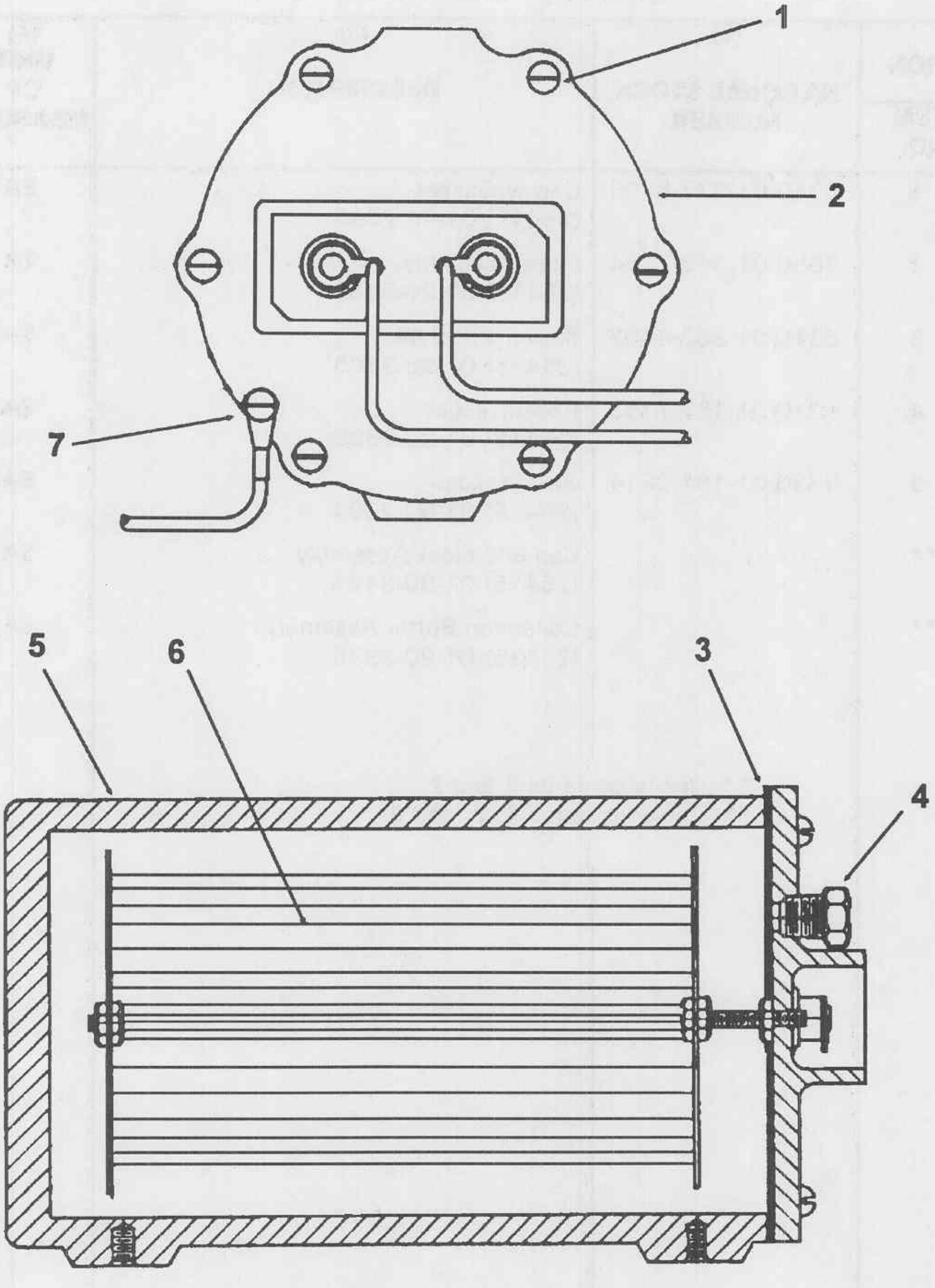

Figure E-4. Vacuum pump components.

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION FIG NO.	(1) ILLUSTRATION ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
E-4	1		Screw, Machine, 8-32 by 5⁄8 in (Bench Stock)	EA	6
E-4	2		Cover Assembly, Cylinder (w/Gasket) (25415) 01-90-3449	EA	1
E-4	3	5330-01-279-2385	Gasket, Cylinder (25415) 01-90-3731	EA	1
E-4	4	5310-01-376-9756	Connector, Tubing (25415) 01-90-2708	EA	1
E-4	5	4320-01-383-0626	Pump Cylinder (25415) 01-90-2715	EA	1
E-4	6	6515-01-191-0844	Heating Element Assembly (25415) 01-90-2713	EA	1
E-4	7		Wire, Ground w/Terminals (25415) 2718-SA	EA	1

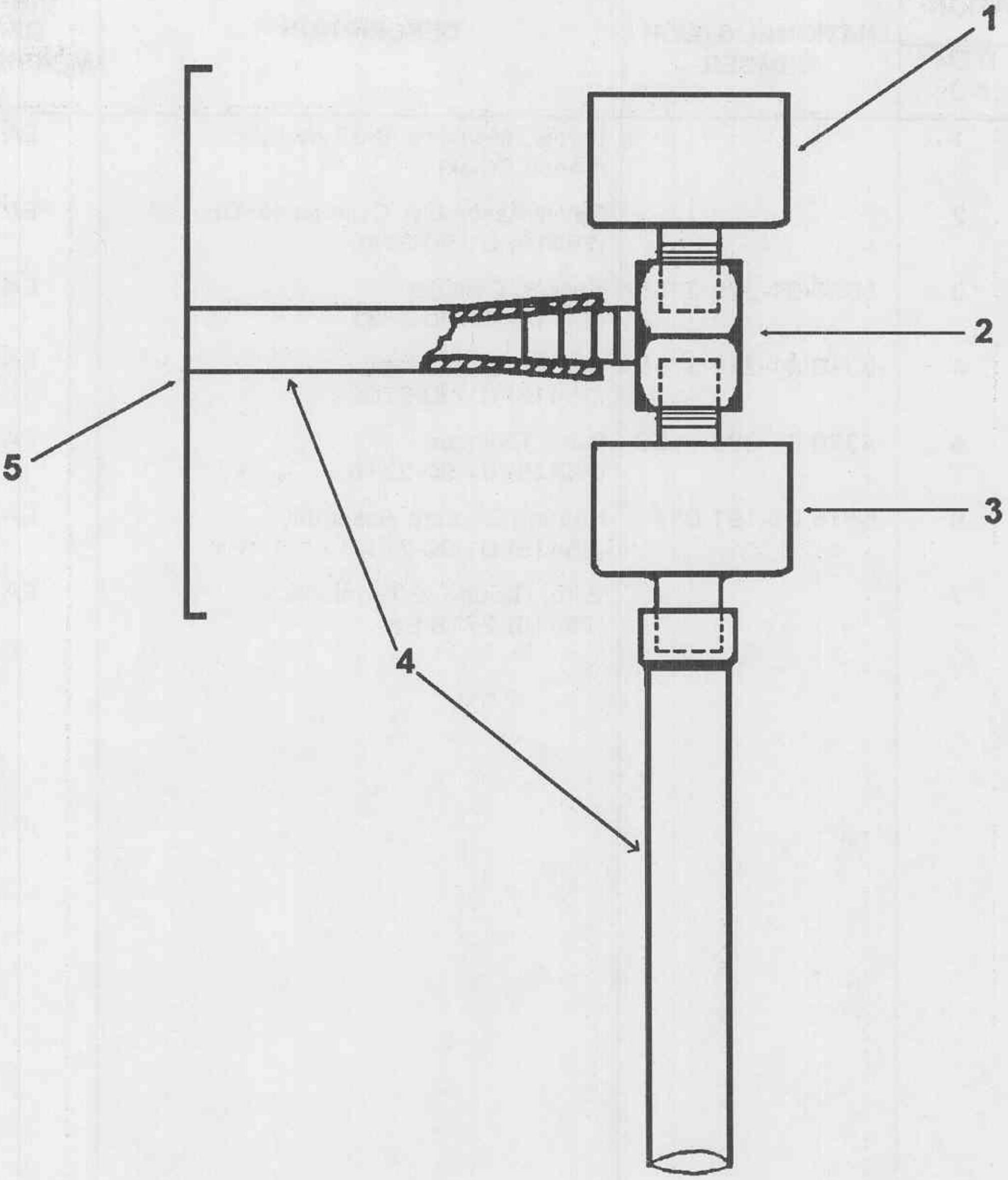

Figure E-5. Valve and manifold assembly components.

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-5	1	4820-01-191-0799	Valve, Pressure (25415) 01-90-3432	EA	1
E-5	2		Manifold (25415) 01-90-2722	EA	1
E-5	3	4820-01-295-4792	Valve, Suction (25415) 01-90-3433	EA	1
E-5	4	6515-01-346-1167	PVC Tubing, 3⁄16 in by 5⁄16 in by 6 ft (25415) 01-90-9034 and Silicone Tubing, 1⁄4 in by 1⁄8 by 6 ft (25415) 01-90-9043	PG	AR
E-5	5	4820-01-383-0560	Valve and Manifold Assembly (25415) 01-90-2725	EA	1

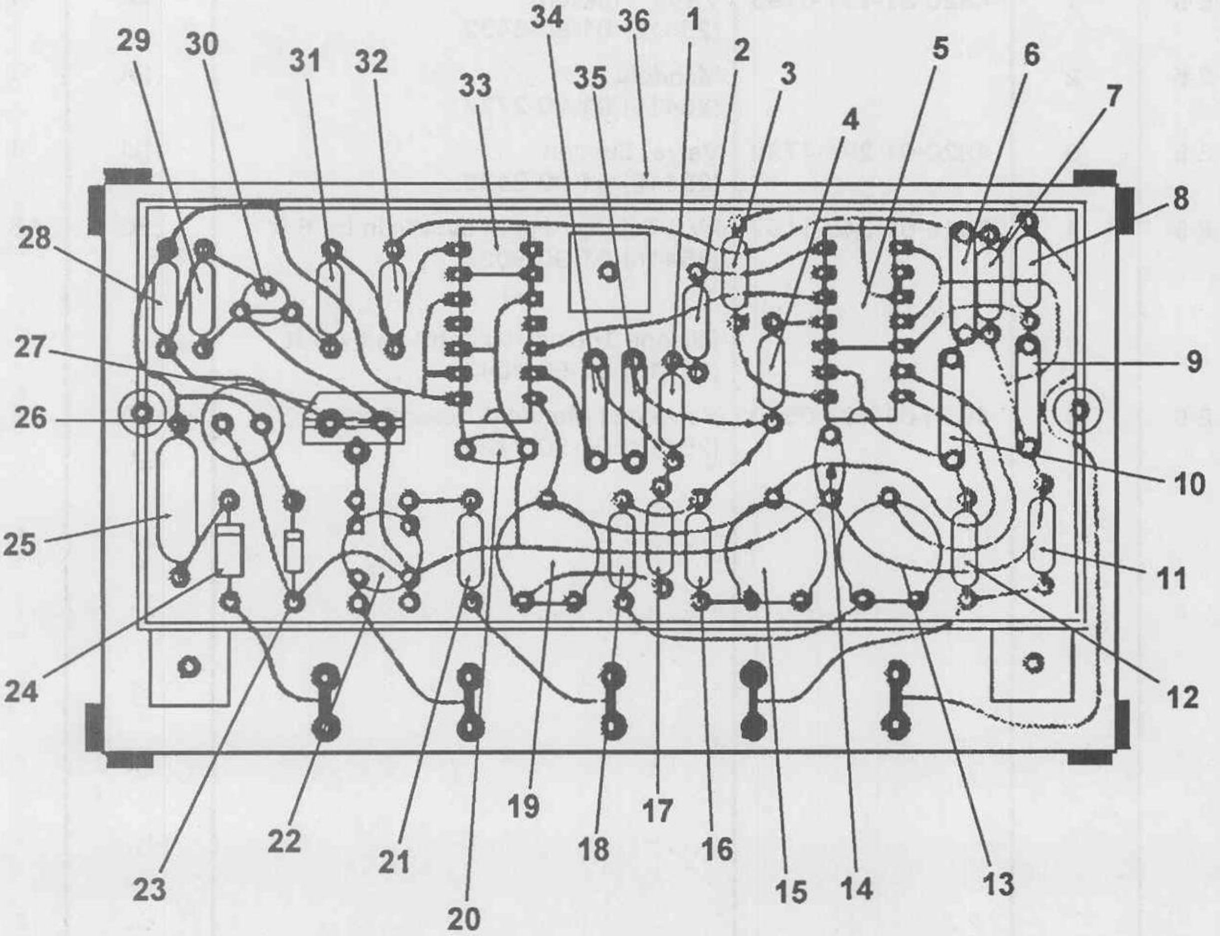
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Figure E-6. PCB.

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	1		Resistor, 390 KΩ, 1/4 W (25415) R11	EA	1
E-6	2		Resistor, 0 Ω, 1/4 W (25415) R16	EA	1
E-6	3		Resistor, 0 Ω, 1/4 W (25415) R15	EA	1
E-6	4		Resistor, 390 KΩ, 1/4 W (25415) R12	EA	1
E-6	5	5962-01-098-6584	Integrated Circuit (IC), MC 14016 B (25415) IC 2	EA	1
E-6	6		Capacitor, 0.01 μF, 250 VDC (25415) C4	EA	1
E-6	7		Resistor, 0 Ω, 1/4 W (25415) R14	EA	1
E-6	8		Resistor, 27 KΩ, 1/4 W (25415) R13	EA	1
E-6	9		Capacitor, 0.1 μF, 250 VDC (25415) C5	EA	1
E-6	10		Capacitor, 0.1 μF, 250 VDC (25415) C1	EA	1
E-6	11		Resistor, 33 KΩ, 1/4 W (25415) R10	EA	1
E-6	12		Resistor, 10 KΩ, 1/4 W (25415) R9	EA	1
E-6	13	5905-01-279-2382	Potentiometer (Trimpot), 1 MΩ (25415) P1	EA	1
E-6	14		Capacitor, 0.001 μF, 500 VDC (25415) C8	EA	1
E-6	15	5905-01-279-2383	Potentiometer (Trimpot), 100 KΩ (25415) P2	EA	1
E-6	16		Resistor, 270 KΩ, 1/4 W (25415) R6	EA	1
E-6	17		Resistor, 120 KΩ, 1/4 W (25415) R7	EA	1

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	18		Resistor, 47 KΩ, 1/4 W (25415) R5	EA	1
E-6	19		Potentiometer (Trimpot), 100 KΩ (25415) P3	EA	1
E-6	20		Capacitor, 0.001 μF, 500 VDC (25415) C7	EA	1
E-6	21		Resistor, 0 Ω, 1/4 W (25415) R17	EA	1
E-6	22		Bridge Rectifier (25415) BR1	EA	1
E-6	23	5961-00-232-3808	Zener Diode, 9 V, 1N5239B (25415) Z1	EA	2
E-6	24	5961-01-262-1047	Diode Rectifier, 1N4004 (25415) D1	EA	1
E-6	25		Resistor, 22 KΩ, 1/2 W (25415) R1	EA	1
E-6	26		Capacitor, 33 μF, 25 VDC, MSR (25415) C6	EA	1
E-6	27	5961-01-269-1736	Silicone Controlled Rectifier (SCR) (25415) Q1	EA	1
E-6	28		Resistor, 10 KΩ, 1/4 W (25415) R2	EA	1
E-6	29		Resistor, 4.7 KΩ, 1/4 W (25415) R3	EA	1
E-6	30	5961-00-145-5991	Transistor, 2N5172 (25415) Q2	EA	1
E-6	31		Resistor, 27 KΩ, 1/4 W (25415) R4	EA	1
E-6	32		Resistor, 27 KΩ, 1/4 W (25415) R8	EA	1
E-6	33	5962-01-240-8271	Integrated Circuit (IC), MC 14541 B, (25415) IC 1	EA	1
E-6	34		Capacitor, 0.1 μF, 250 VDC (25415) C2	EA	1

Section II. REPAIR PARTS LIST FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	35		Capacitor, 0.01 μF, 250 VDC (25415) C3	EA	1
E-6	36	6515-01-180-6982	PCB (25415) 01-90-2311	EA	1

Section III. SPECIAL TOOLS, TEST, AND SUPPORT EQUIPMENT FOR SUCTION APPARATUS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				

THERE ARE NO SPECIAL TOOLS, TEST, OR SUPPORT EQUIPMENT APPLICABLE FOR THIS END ITEM.

GLOSSARY

AFR	Air Force regulation
Amp	Ampere
app	Appendix
AR	Army regulation
AR	As required
B	Black
BR	Bridge rectifier
C	Capacitor
C	Operator/crew
CAGE	Commercial and government entity
cm	Centimeter
CN	Can
CTA	Common table of allowances
CVC	Calibration/verification/certification
°C	Degrees Celsius
°F	Degrees Fahrenheit
D	Depot level maintenance
D	Diode
DA	Department of the Army
DC	Direct current
DLA	Defense Logistics Agency
DLAM	Defense Logistics Agency manual
DPSC	Defense Personnel Support Center
DS	Direct support
EA	Each
EtO	Ethylene oxide
F	Direct support maintenance
FIG (fig)	Figure
Fish paper	A type of fiber used in sheet form for insulating purposes where high mechanical strength is required

FM	Field manual
FSC	Federal supply class
FSCM	Federal supply code for manufacturers. This is an obsolete term. CAGE (commercial and government entity) is the correct acronym.
ft	Feet
G	Green
Gal	Gallon
GS	General support
H	General support maintenance
Hg	Mercury
Hz	Hertz
IC	Integrated circuit
in	Inch
ISO	International Standards Organization
JTA	Joint table of allowances
kg	Kilogram
lb	Pound
lpm	Liter per minute
MAC	Maintenance allocation chart
MAN	Manual
min	Minute
mL	Milliliter
mm	Millimeter
mmHg	Millimeters of mercury
MPL	Mandatory parts list
MTOE	Modified table of organization and equipment
NO.	Number
NSN	National stock number
O	Unit maintenance
oz	ounce
P	Potentiometer
para	Paragraph

PCB	Printed circuit board
PG	Package
PMCS	Preventive maintenance checks and services
PVC	Polyvinyl chloride
Q	Transistor
QC	Quality control
QTR YR	Quarter year
QTY	Quantity
R	Resistor
Ref	Reference
RO	Roll
RPL	Repair parts list
SB	Supply bulletin
SCR	Silicon controlled rectifier
sec	Second
SER	Serial
TB	Technical bulletin
TDA	Table of distribution and allowances
TM	Technical manual
TRANS	Transformer
V	Volts
VAC	Volts alternating current
VDC	Volts direct current
W	White
Z	Zener diode
µF	Microfarad (one-millionth)
Ω	Ohm
KΩ	Kilohm (1,000)
MΩ	Megohm (1,000,000)

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E-11		E-6		Reverse call-out numbers 7 and 8. REASON: Correctly identifies part.

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METRIC SYSTEM CONVERSIONS

CHANGE	TO	MULTIPLY	CHANGE	TO	MULTIPLY
inches	centimeters	2.540	centimeters	inches	.394
feet	meters	.305	meters	feet	3.280
yards	meters	.914	meters	yards	1.094
sq inches	sq centimeters	6.451	sq centimeters	sq inches	.155
sq feet	sq meters	.093	sq meters	sq feet	10.764
cubic feet	cubic meters	.028	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	milliliters	fluid ounces	.034
pints	liters	.473	liters	pints	2.113
quarts	liters	.946	liters	quarts	1.057
gallons	liters	3.785	liters	gallons	.264
ounces	grams	28.349	grams	ounces	.035
pounds	kilograms	.454	kilograms	pounds	2.205

TEMPERATURE CONVERSION

Degrees Fahrenheit to Degrees Celsius: (°F - 32) X .5555 = °C

Degrees Celsius to Degrees Fahrenheit: (°C X 1.8) + 32 = °F

WEIGHTS

1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds

LINEAR MEASURE

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches

CUBIC MEASURE

1 cu centimeter = 1000 cu millimeters = .06 cu inch
1 cu decimeter = 1000 cu centimeters = 61.02 cu inches
1 cu meter = 1000 cu decimeters = 35.31 cu feet

LIQUID MEASURE

1 centiliter = 10 milliters = .34 fluid ounce
1 deciliter = 10 centiliters = 3.38 fluid ounces
1 liter = 10 deciliters = 33.81 fluid ounces